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MACQUARIE
University

16 September 2016

Mr Andrew Popoff
Senior Land Use Planner
Network Management / Journey Management
Roads and Maritime Services
Level 5, 27 Argyle Street Parramatta NSW 2150

Dear Andrew,

RE MACQUARIE UNIVERSITY - GATEWAY DESIGN APPROVAL

Further to our recent meetings and correspondence, please find enclosed the TMP for the Herring Road and Waterloo Road Gateway precinct. We believe that this is the final component required for the RMS sign off of Macquarie University's Gateway reconfiguration project.

As we have previously identified, changes to the Herring Road Gateway were subject to outstanding conditions in the 2010 Concept Plan approval being satisfied. Several conditions have been the subject of discussions between the University and RMS.

The status of these is as follows:

- **Voluntary Planning Agreement** – formal arrangements for the two outstanding elements are currently being finalised with the Department of Planning and Environment and Ryde Council:
 - Intersection upgrades – the University's contributions associated with the intersection upgrade requirements are being finalised as part of the current VPA discussions with the Department of Planning and Environment.
 - Shared Use path – Macquarie University and Ryde Council have reached an in-principle agreement whereby the University will make a payment to Ryde Council for the construction of the shared use path.
- **Traffic model** – The RMS have confirmed that, whilst they do not provide endorsement for the latest iteration of the 'future state' Arup Paramics model, once the abovementioned VPA has been executed the RMS will sign off on the micro-simulation model previously undertaken in order to close out conditions C10(2), C10(4), C15(1) – (4) and B3(2) of the Macquarie University Concept Plan Approval (MP06_0016) and conditions E1(a),(b),(c) of the Project Approval for the Australian Hearing Hub (MP10_0032).
- **Bus Priority Lane** – The Concept Plan approval notes a requirement for future accommodation of bus priority lanes. Their provision is subject to future needs rather than any existing demand or service issues. Modelling has demonstrated that with the proposed changes to the Herring Road intersection, changes to the internal campus road layout (particularly the closure of Research Park Drive) and relocation of car parks to the periphery of the campus, traffic on University Avenue reduces and there is no immediate need for bus priority lanes.

There is currently no defined trigger for provision of the bus priority lanes. To ensure future certainty, Macquarie University is committing to undertake a traffic count, over a minimum four-week period every two years, to understand the volume of traffic using the kerbside travel lane on University Avenue. Should the volume of traffic in the kerbside lane, in the busiest hour of the day for greater than 50% of the survey period, exceed 398 vehicles (the modelled capacity of the lane), Macquarie University will commit to initiating discussions with RMS and Transport for NSW to discuss the potential for either:

- Providing a bus priority lane on University Avenue; or
- Reinstating the right turn lane on University Avenue.

Further details regarding the background and basis for this trigger is provided in the Traffic Management Plan (TMP) developed by Arup for the Gateway project.

The planned closure of rail services along the Epping to Chatswood Rail Line during conversion to the new Metro service requires replacement bus services that will add significantly to traffic in the Macquarie Park corridor. The University's Gateway proposal has demonstrated that traffic movement changes at the Herring Road/Waterloo Road intersection deliver significant performance improvements which would assist during this period.

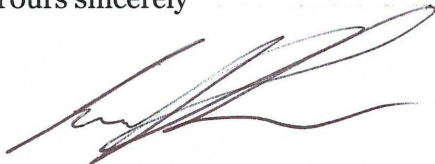
The University is planning to complete the Gateway upgrade well before the 2018 shutdown. To that end, we respectfully request that processing of the Gateway TMP and traffic signal design submission is progressed as soon as possible to allow approval in ample time for works to be completed in good time.

Thank you for your assistance throughout this involved process. Please don't hesitate to contact the team should you have any questions or issues with the documentation:

Cameron Kline	Macquarie University	9850 7158
Rob Alcock	Macquarie University	9850 1362
Josh Milston	Arup	9320 9320
Stephen Brain	TTW	9439 7288

We look forward to finalisation of the approval at your earliest convenience.

Yours sincerely



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Macquarie University
02 9850 7158

cc. Greg Flynn, Manager, Strategic Land Use, Network & Safety Sydney, RMS

Macquarie University
**Macquarie University Gateway
Project**
Traffic Management Plan

Issue | 16 September 2016

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 224322-13

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ARUP

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Revised Traffic Signal Plan (TCS 1798)

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Traffic Volume Diagrams

1 Introduction

This traffic management plan (TMP) has been prepared to support the proposed Macquarie University Gateway project. The report summarises the traffic implications arising from the reconfiguration of the road network associated with the project. This road network supports the overarching objectives of the Macquarie University Master Plan in enhancing pedestrian amenity, safety and connectivity through the campus.

2 Existing Traffic Conditions

The existing conditions are modelled based on traffic surveys undertaken on the following dates:

- Thursday 1 August 2013 (traffic counts)
- Thursday 13 August 2015 (origin-destination survey);

2.1 Intersection Counts

Turn movement data was collected on Thursday 1 August 2013 at four signalised intersections as shown in Figure 1, including:

- Herring Road / Talavera Road
- Herring Road / Waterloo Road
- Epping Road / Herring Road
- Epping Road / Balaclava Road

The surveys were conducted during the morning (7am – 10am) and evening (4pm – 7pm). The data was obtained after the opening of the new M2 ramps at Herring Road / Christie Road.



Figure 1: August 2013 traffic survey locations

2.2 Origin-Destination Surveys

Arup commissioned Sky High Traffic Data Australia to undertake an origin-destination survey of Macquarie University on 10 August 2015 during the morning (7am – 10am) and evening (4pm – 7pm) periods. The data was obtained to determine the number of vehicles and how they utilised the internal roads around the University and through Macquarie Park.

The number of vehicles entering and exiting the university will be identified by matching the respective number plates at each entry and exit. The survey was undertaken at the following four locations:

- Balaclava Road (north of Epping Road)
- University Avenue (west of Herring Road)
- Innovation Road (west of Herring Road)
- Research Park Drive (south of Talavera Road)



Figure 2: Origin-Destination Survey locations

Key findings of the survey are summarised below and illustrated in Figure 3 and Figure 4:

- Of all vehicles exiting the university at the Waterloo Road / Herring Road intersection in the AM peak period, 67% (544 vehicles) were found to be through traffic (i.e. 'rat running') originating from either Talavera Road or Balaclava Road. This figure dropped to 13% (208 vehicles) in the PM peak period.
- Through traffic constituted between 15% and 23% of all vehicles exiting Balaclava Road in both the AM and PM peaks. The majority of this through traffic originated from University Avenue.
- There were a high number of vehicles, classified as through traffic, recorded to enter the campus at Research Park Drive and exit at University Avenue.
- A lower proportion of through traffic was recorded at the Talavera Road exit (via Research Park Drive), with 17% / 10% of vehicles matched during the AM / PM peaks. The vast majority of these vehicles originated from University Avenue.

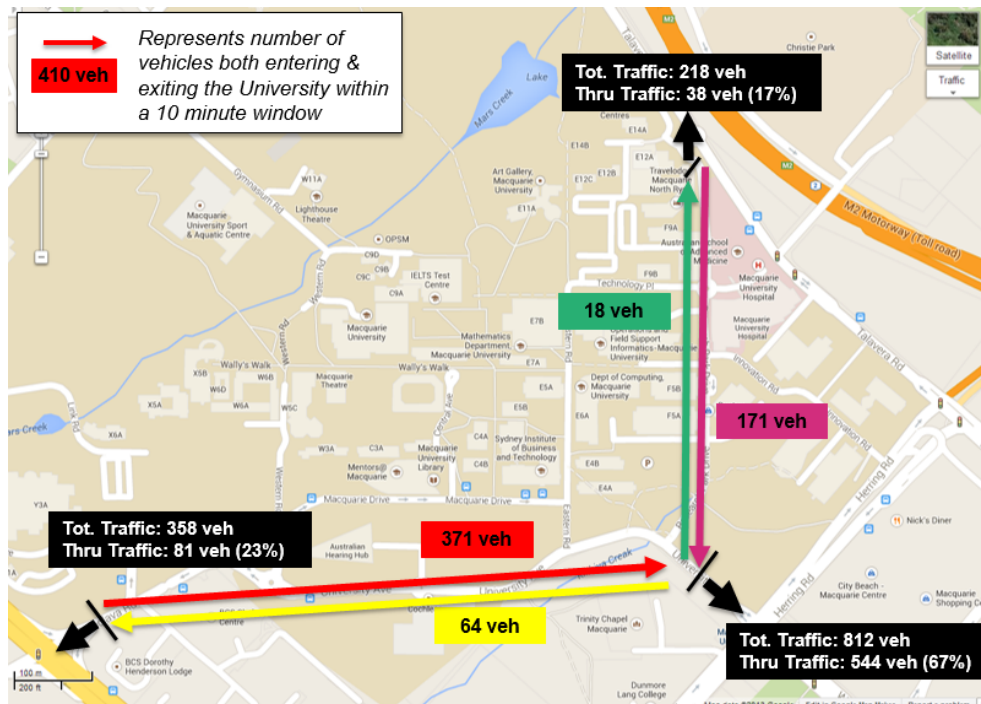


Figure 3: AM Peak (7am-10am) summary: origin-destination surveys

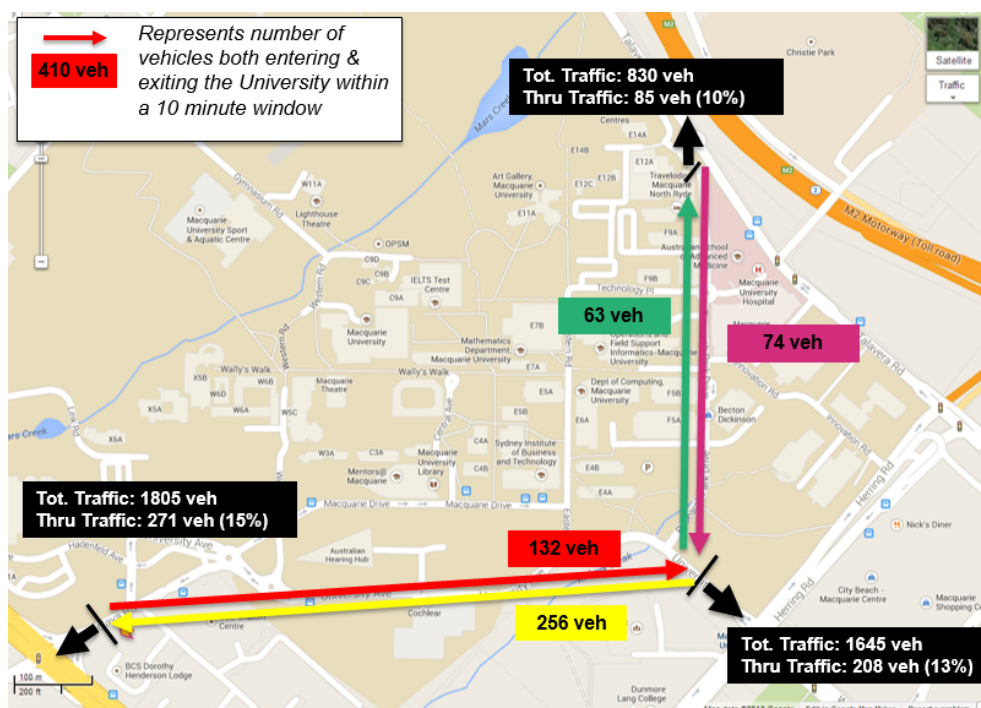


Figure 4: PM Peak (4pm-7pm) summary: origin-destination surveys

The volume of through traffic, particularly during the AM peak, is considered excessive and detracts from the pedestrian environment within the campus core, particularly with respect to speeding vehicles and disregard for the safety of the pedestrian population. The Macquarie University Master Plan includes measures aimed at minimising through traffic and speeding through amended road design and changes to the road network. This is discussed further in the following sections.

3 Macquarie University Master Plan

3.1 Overview

The objectives of the Macquarie University Master Plan is to enhance the connectivity, safety and amenities for all campus users, particularly for pedestrians. Vehicular traffic is intended to be directed to improve pedestrian movement within the centre of the campus. A new landscaped entry from Herring Road is planned to provide pedestrians with a direct and uninterrupted link between the Macquarie University railway station to the campus core. Figure 5 illustrates the key features of the Master Plan.



Figure 5: Macquarie University Master Plan

3.2 Proposed Road Network Amendments

To support the objectives of the Macquarie University Master Plan, particularly with respect to enhanced pedestrian safety and connectivity, two amendments to the road network layout and configuration servicing the campus are proposed.

1. Closure of Research Park Drive near University Avenue. This measure would facilitate the provision of a continuous, uninterrupted pedestrian connection between Macquarie University railway station and the academic core of the campus. This will include a new pedestrian walkway across University Creek.
2. Reducing the width of the University Avenue road carriageway to support a widened footpath on the northern side of the road. The Herring Road entry to the University will require a major reconfiguration to create a ‘gateway’ – incorporating a wide, tree lined pedestrian oriented environment. This will create a public realm commensurate with a private road serving a pedestrian oriented campus, accommodating the increased pedestrian movements expected as the campus grows over the coming years.

As a result of the intersection configuration to accommodate the enhanced pedestrian environment, the road will be narrowed to accommodate fewer traffic lanes – identifying the campus as private land. It is proposed to provide one ingress lane and two egress lanes (down from the existing three). This reduction in egress lanes will result in the existing right hand turn from Waterloo Road to Herring Road to be prohibited.

The proposed amendments are summarised and illustrated in Figure 6.



Figure 6: Proposed road network amendments

4 Operational Traffic Analysis

4.1 Traffic Redistribution Assumptions

The traffic analysis undertaken accounts for the redistribution of the traffic as a result of the proposed amendments for the Macquarie University Gateway as described in section 3.2. The extent of the redistribution is based on the following factors:

- The existing conditions based from the traffic data collected in the Macquarie Park precinct
- The key origin-destination movements in Macquarie park which will detail vehicle behaviour, particularly around and between Macquarie University and Macquarie Shopping Centre
- The current operation and performance of the road network in Macquarie Park which would inform the route choice of drivers

The traffic redistribution assumptions used were agreed by Arup and RMS following a number of workshops in July 2015.

4.2 Traffic Redistribution

The proposed amendments for the Macquarie University Gateway projects (detailed in section 3.2) include:

- The closure of Research Park Drive, impacting vehicular movements between Talavera Road and Waterloo Road as well as the car park entry/exit on Research Park Drive
- Prohibiting the right turn movement from University Avenue onto Herring road as a result of the widened footpath upgrade

The traffic redistribution as a result of the modifications required, are illustrated and summarised in Figure 7 to Figure 10 below.

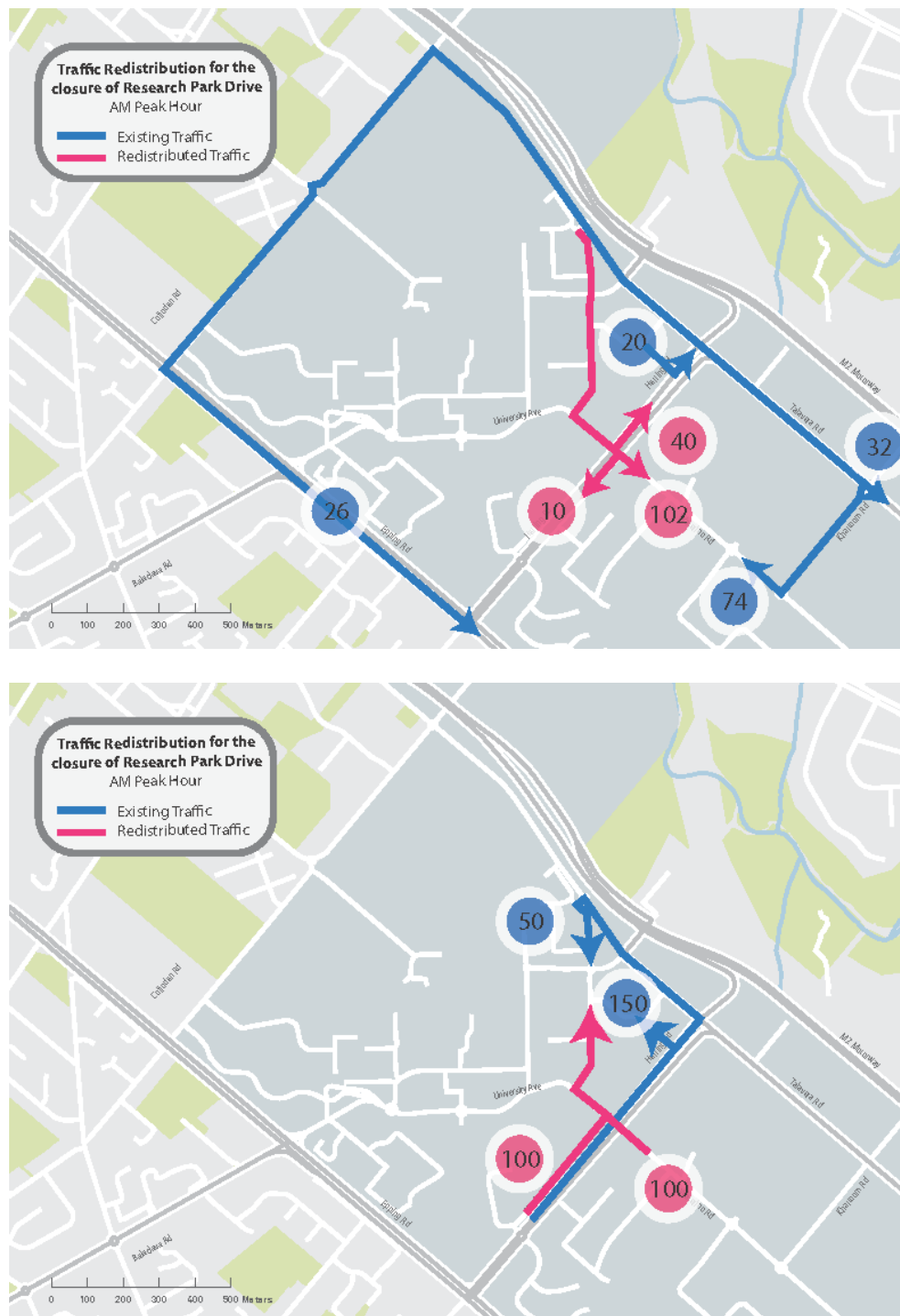
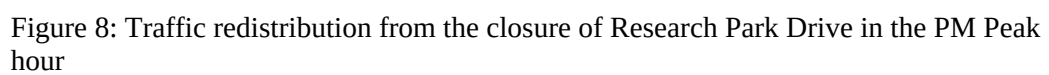


Figure 7: Traffic redistribution from the closure of Research Park Drive in the AM Peak hour



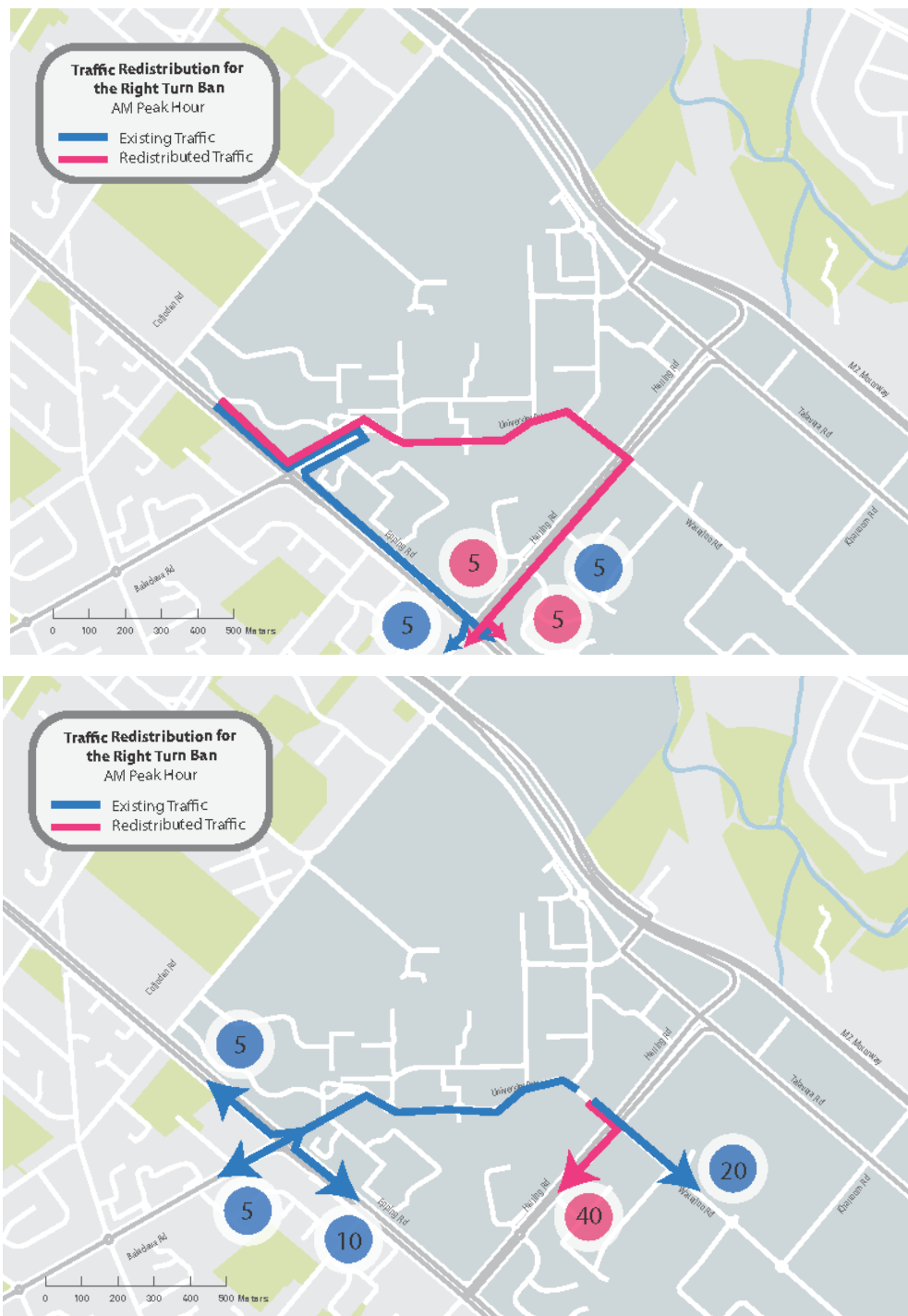


Figure 9: Traffic redistribution from the right turn ban in the AM Peak hour

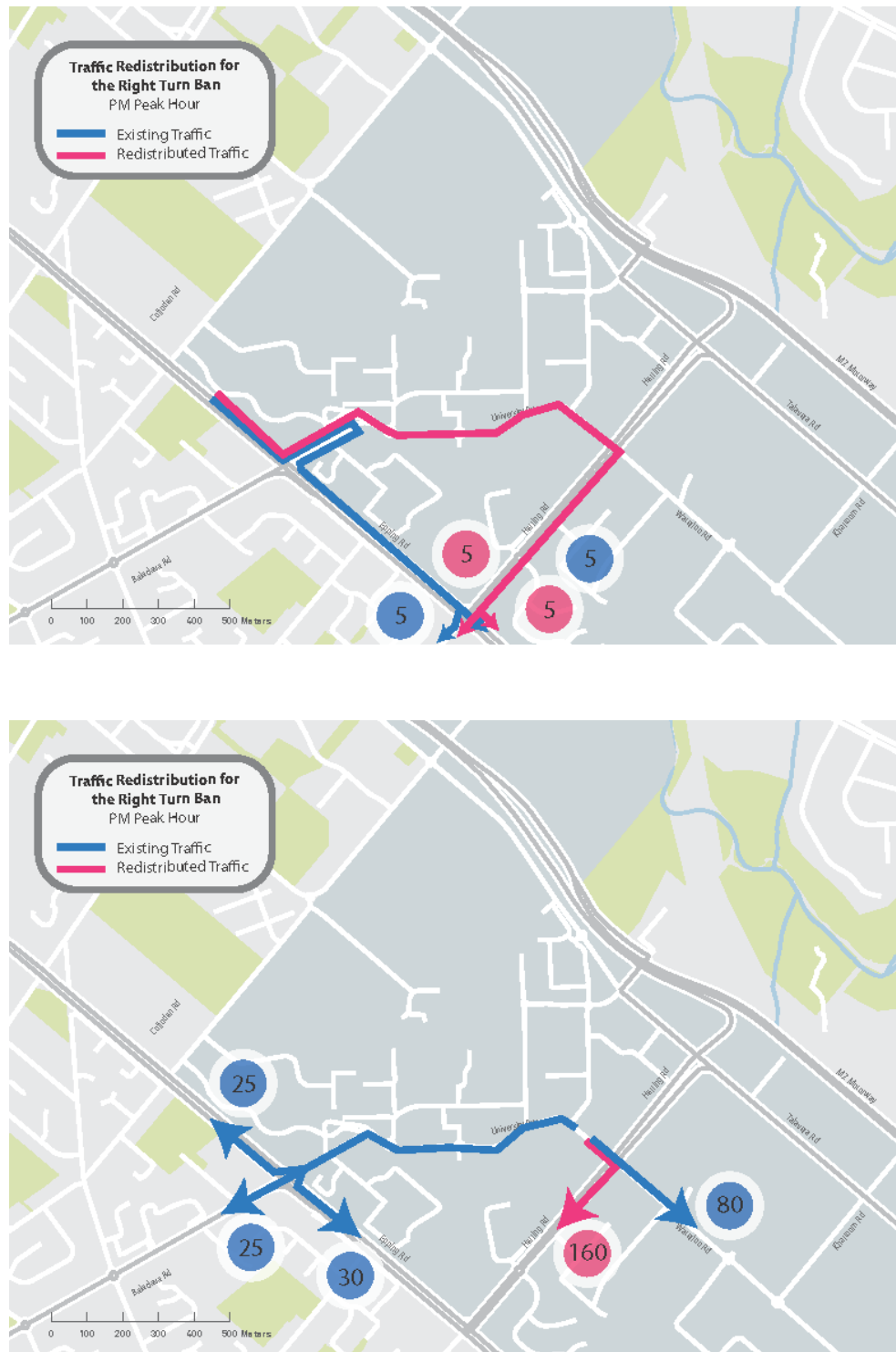
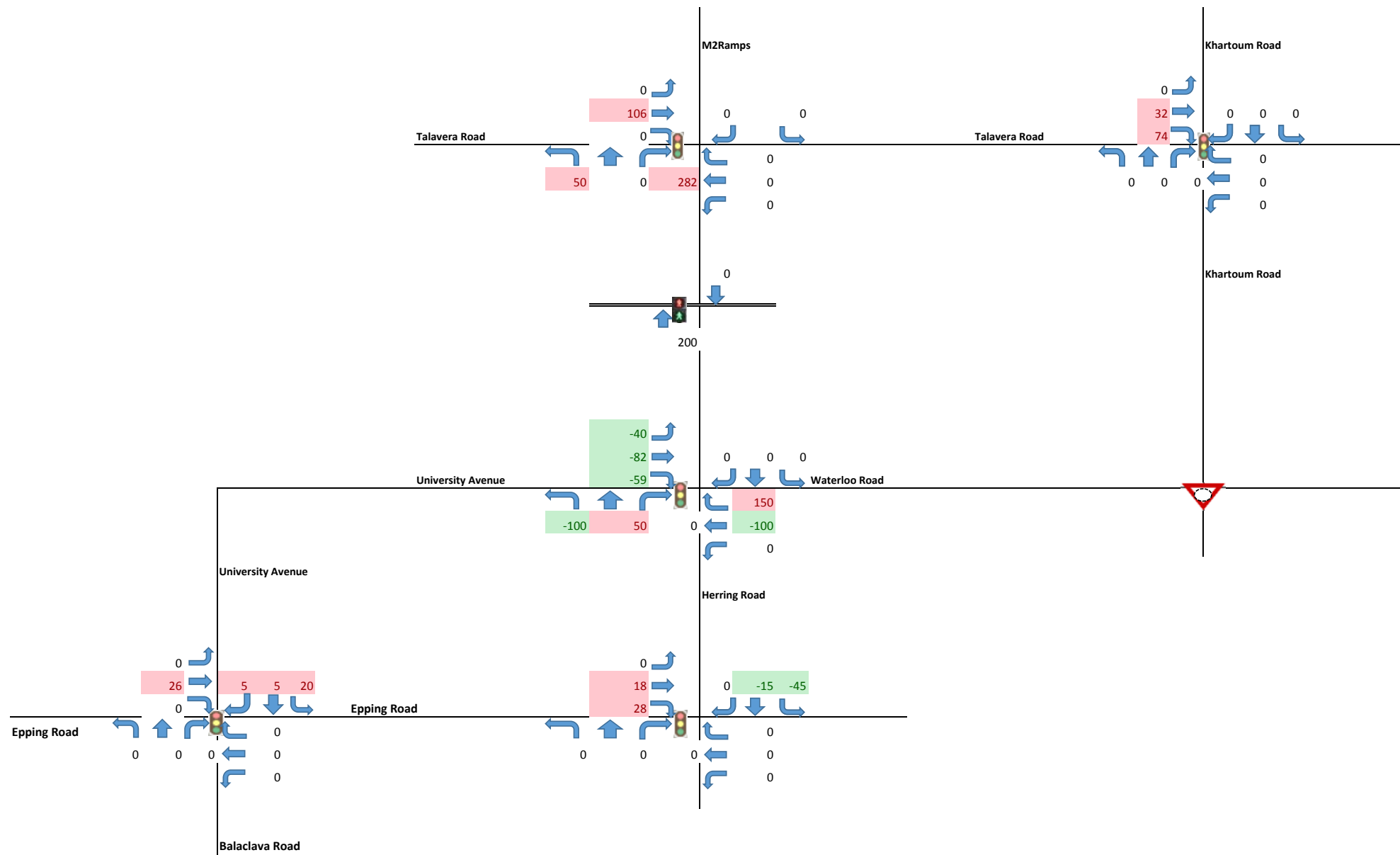


Figure 10: Traffic redistribution for the right turn ban in the PM Peak hour

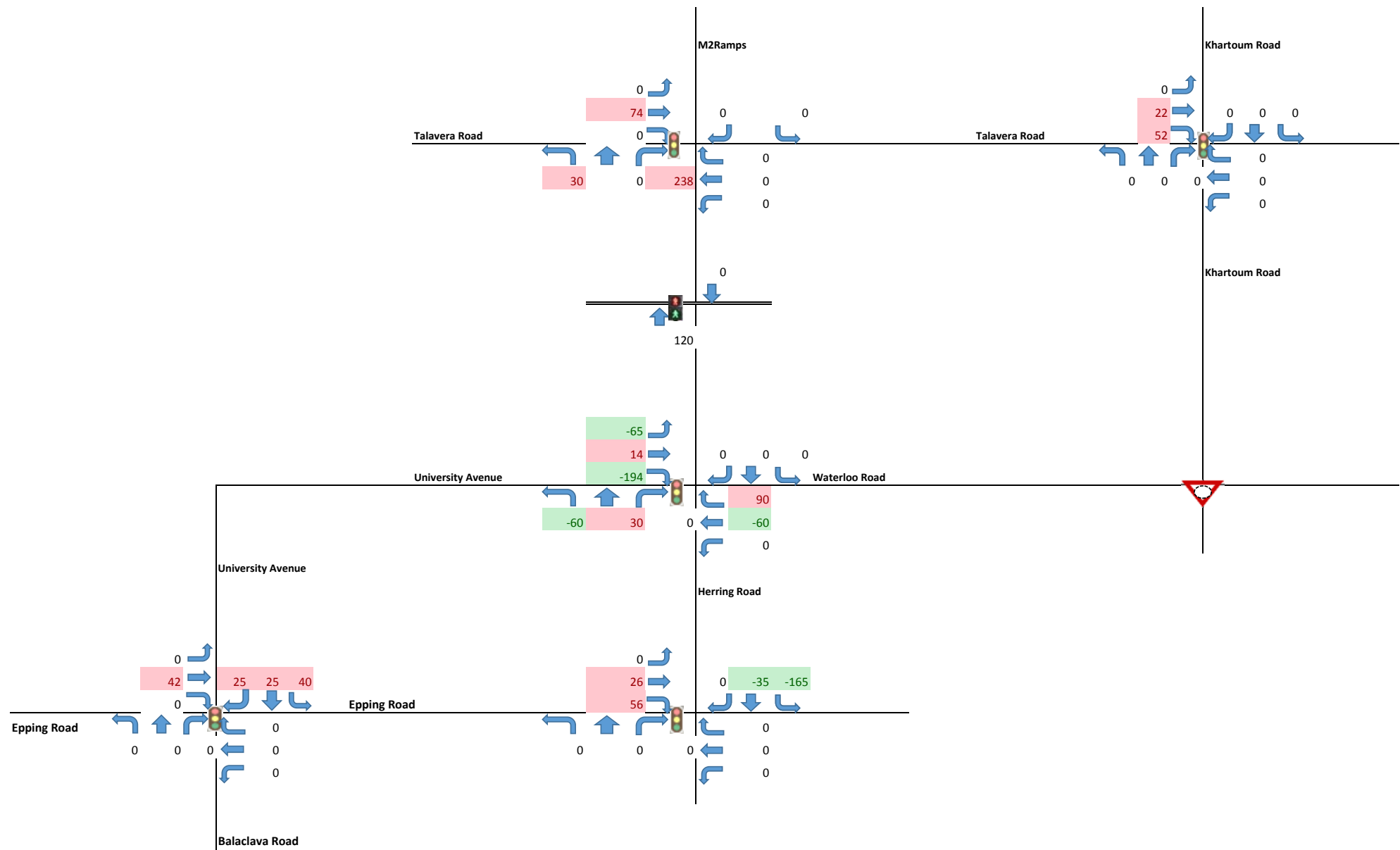
4.3 Cumulative Traffic Changes

Based on the above redistribution diagrams and existing traffic flows, future traffic volumes at key intersections on the Macquarie Park road network could be forecast. Changes in traffic flows are presented in the figures on the following pages, with total traffic volumes presented in Appendix C.

AM Peak Hour - Change in traffic flows



PM Peak Hour - Change in traffic flows



4.4 Traffic Modelling

The section details the modelling assumptions and methods undertaken to assess the core intersections around the Macquarie Park local network. The following key signalised intersections were modelled:

- Herring Road / Talavera Road
- Talavera Road / Khartoum Road
- Herring Road mid-block pedestrian crossing
- Waterloo Road / Herring Road
- Epping Road / Balaclava Road
- Epping Road / Herring Road

The modelling was undertaken using SIDRA Intersection, to assess the impact of the proposed upgrades by testing the performance relative to a base case. The AM and PM peak hours were modelled for the two identified scenarios:

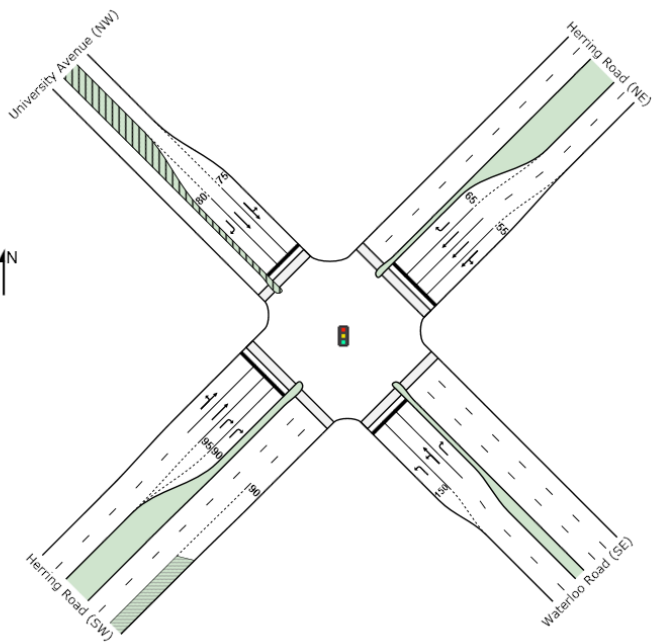
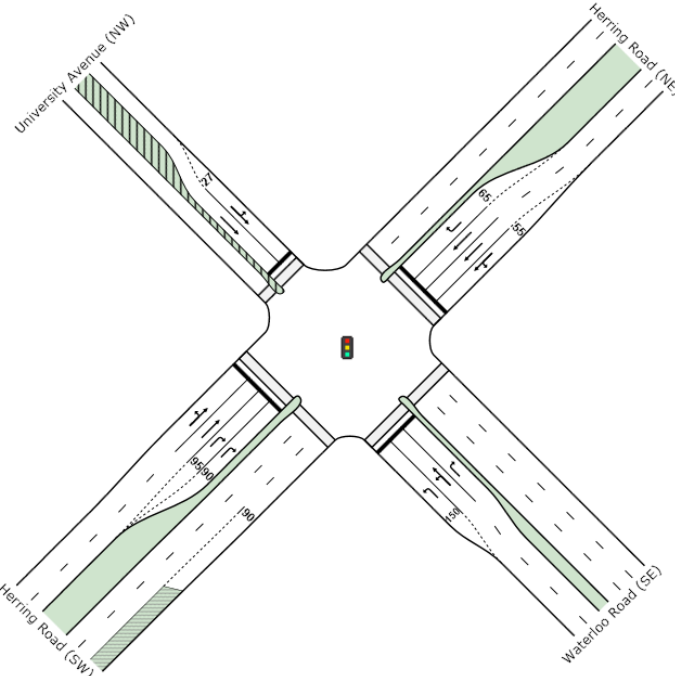
- Existing conditions
- Reconfigured network case – with the closure of Research Park Drive and the right turn ban from University Avenue onto Herring Road

All intersections with the exception of Herring Road / Waterloo Road, were modelled with the same configuration as the existing case. The reconfigured Herring Road / Waterloo Road intersection, due to the banning of the right turn movement, is illustrated in Table 1.

A preliminary traffic signal plan has been developed for the revised intersection, which is provided as Appendix B of this document.

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Table 1: Reconfiguration of Herring Road / Waterloo Road intersection

Herring Road / Waterloo Road / University Avenue (Existing scenario)	Herring Road / Waterloo Road / University Avenue (Right turn ban on University Avenue)
	

4.4.1 Traffic Modelling Results

The intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (measured in seconds per vehicle)
- Level of Service (LoS)

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LOS), is based on the average delay per vehicle. LOS ranges from A = very good to F = unsatisfactory.

Another common measure of intersection performance is the degree of saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity.

The performance indicator for the comparison of the two scenarios include volume demands (vehicles per hour), Level of Service (LoS), average delay (seconds), Degree of Saturation (DoS).

The results of the analysis are summarised in Table 2 and the level of service comparison illustrated in Figure 13 and Figure 14. The detailed modelling results are provided in Appendix A.

Table 2: Traffic modelling results

Peak Hour	Intersection	Existing Road Network				Reconfigured Road Network			
		Volume (veh/hr)	Delay (s)	LoS	DoS	Volume (veh/hr)	Delay (s)	LoS	DoS
AM	Herring Talavera	2186	26	B	0.83	2342	27	B	0.89
	Talavera Khartoum	2646	43	D	0.96	2752	68	E	1.07
	Herring Midblock	1154	7	A	0.38	1354	8	A	0.46
	Waterloo Herring	2848	51	D	0.91	2667	35	C	0.89
	Epping Balaclava	4265	62	E	0.98	4321	65	E	0.99
	Epping Herring	5464	71	F	1.00	5450	72	F	1.00
PM	Herring Talavera	2389	29	C	0.69	2493	30	C	0.74
	Talavera Khartoum	2535	35	C	0.70	2609	42	C	1.02
	Herring Midblock	1711	8	A	0.48	1831	8	A	0.53
	Waterloo Herring	3507	42	C	0.73	3262	40	C	0.91
	Epping Balaclava	4283	62	E	0.99	4415	63	E	0.99
	Epping Herring	5348	47	D	0.88	5230	52	D	0.88

LOS – Level of Service, DOS – Degree of Saturation, Delay – Average Vehicle Delay (seconds)

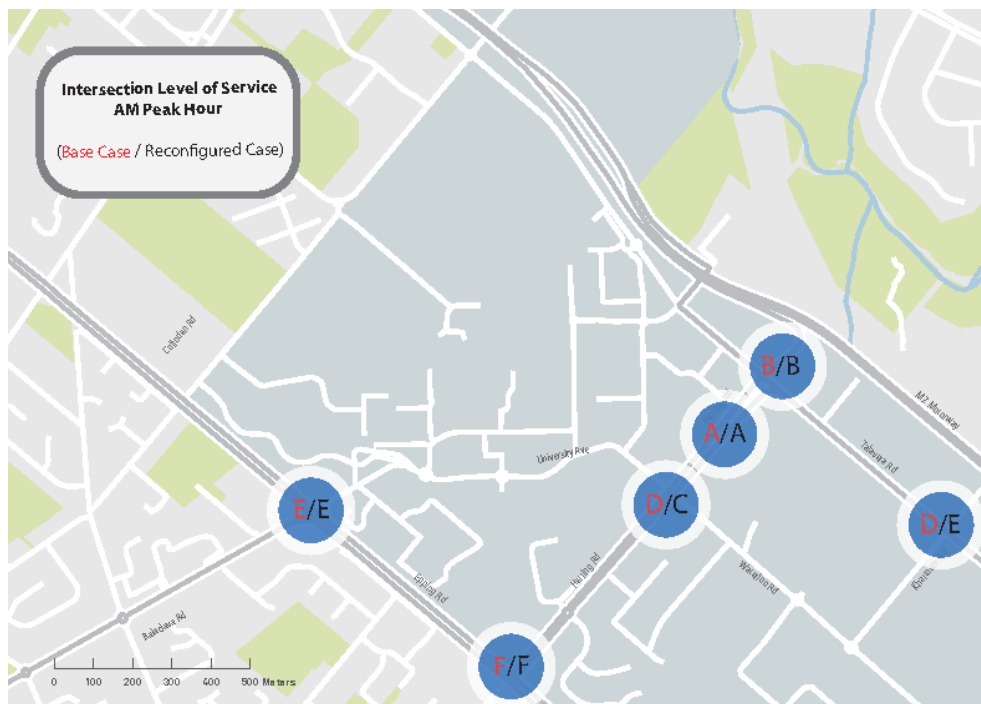


Figure 13: Intersection Level of Service for the AM Peak hour

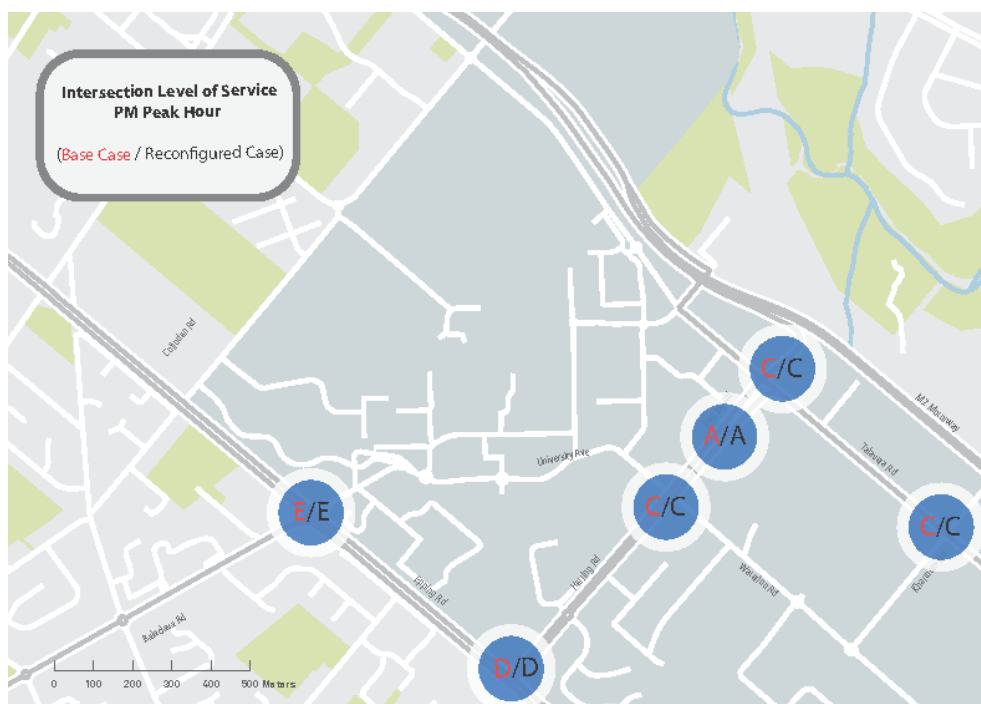


Figure 14: Intersection Level of Service for the PM Peak hour

The traffic modelling demonstrates little change in the operation of key intersections as a result of the proposed road network amendments. During both peak hours, the level of service of all intersections analysed remains unchanged apart from Talavera Road / Khartoum Road in the AM peak hour, with only minor changes in average delays for vehicles. Reduced delays are forecast at the Herring Road / Waterloo Road intersection in both peak hours which is reflective of the reduced number of signal phases arising from the prohibited right turn from University Avenue into Herring Road.

4.4.2 Bus Travel Time

The impact of bus reliability due to the proposed amendments is critical due to the high usage and frequent services within Macquarie Park. Bus priority infrastructure is currently not provided along the corridor and it is noted that the delay or improvement to travel time incurred by buses along the sections are also incurred by private vehicles.

The relative change in the bus performance on the network as a result the amendments are assessed with the major bus movements travelling along Epping Road, between Epping Road and Herring Road, and between Balaclava Road and Herring Road.

The current bus routes that travel through the intersections modelled include:

- Along Epping Road: 293, 295
- Epping Road to Herring Road via University Avenue: 288, 290, 292, M54, 458, 506
- Balaclava Road to Herring Road via University Avenue: 544, 545

The following figures outlines the travel time improvement or delay incurred by buses. It should be noted that the figures indicate changes in delay at the key intersections impacted by the Macquarie University Gateway project, and not for the entire route.



Figure 15: Change in bus delay in AM Peak hour



Figure 16: Change in bus delay in PM Peak hour

As shown in the figures, there is a significant improvement to Herring Road / Waterloo Road as a result of the proposed amendments. Overall there is a net reduction in delay on all bus movements in both peaks hour periods.

5 Construction Staging

Construction of the Gateway project is expected to extend for a six month period – scheduled for the first half of 2018. Construction will be completed prior to the closure of the shutdown of the Epping to Chatswood rail line which scheduled to commence in the third quarter of 2018.

There are three stages of construction for the Gateway project, as illustrated in Figure 17, Figure 18 and Figure 19 respectively. In all three stages two-way traffic movements will be retained on University Avenue, as well as a pedestrian footpath on the northern side of University Avenue. 4m wide traffic lanes have been provided to allow for turning movements into and out of University Avenue.

It is anticipated that on departure from the campus vehicles will be able to turn left onto Herring Road or travel through on Waterloo Road. Right turns onto Herring Road will not be permitted – as per the ‘end state’ outcome.

Prior to construction commencing on-site, a detailed construction traffic management plan will be prepared which provides further details on construction arrangements and timing.

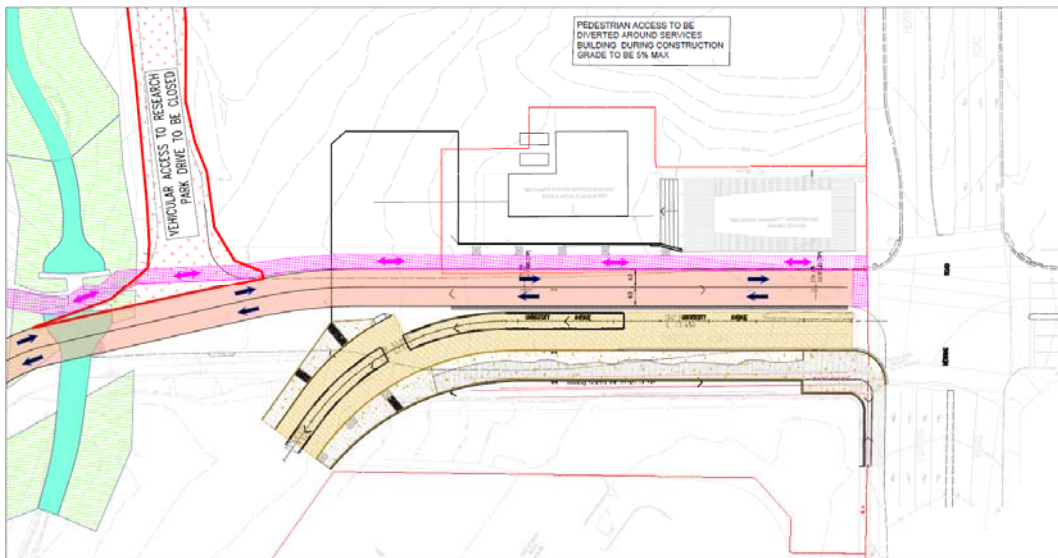


Figure 17 Construction stage 1

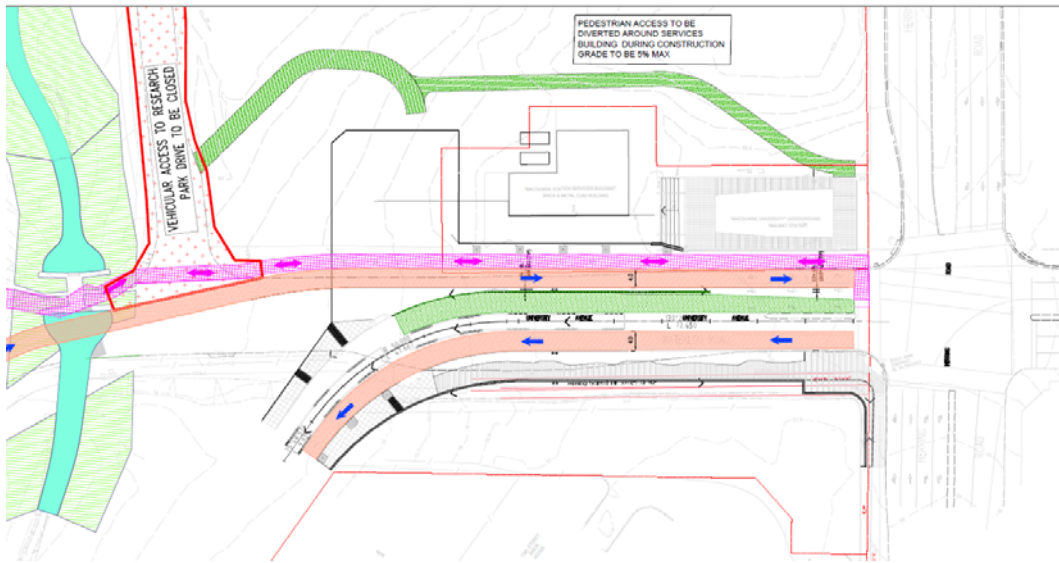


Figure 18 Construction stage 2

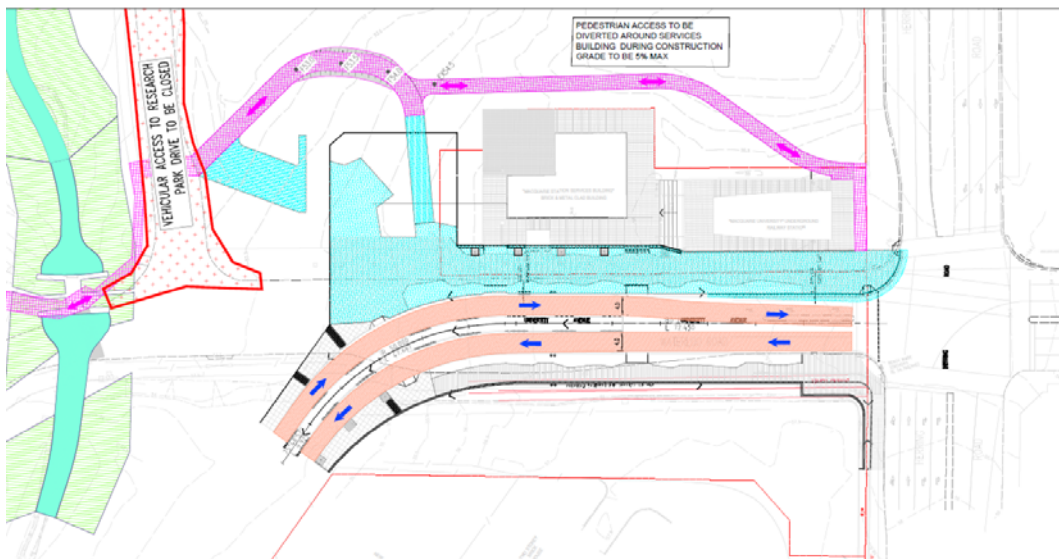


Figure 19 Construction stage 3

6 Consultation

6.1 Agencies

Arup and Macquarie University attended a meeting with representatives of Roads and Maritime, Transport for NSW and City of Ryde Council to discuss the proposed Gateway project in June 2016. The merits of the project, as well as the requirements for input into the TMP for the project, were discussed at the meeting.

6.2 Community

A Community Consultation for the proposal was held on Monday the 22nd of August. The Consultation process and event was organised and managed by JBA, as Specialist Independent Facilitators. The Consultation was held at 140A Herring Road, North Ryde, adjacent to Macquarie University Station. This location was chosen due to its:

- High visibility; and
- High volume of passing pedestrian traffic

The Consultation was held to inform the Staff, Students and the Public of the proposed changes to the University's Herring Rd/Waterloo Rd Gateway Entry. Notifications about the Community Consultation and proposed changes were published on the University's website, along with signs placed around the station in the weeks leading up to the event.

Present at the Community Consultation were:

- JBA Communications and Engagement Representative (Consultation Facilitator)
- Arup Traffic Representative
- Macquarie University Infrastructure Manager
- Macquarie University Planner

A total of 47 people attended the event to either review the information provided and/or discuss the proposed changes. After discussing the benefits of the proposal with the team, most attendees that were initially opposed, appeared to leave supportive of the scheme.

There were a total of 6 written submissions on the day, and a further 3 emailed submissions. 3 submissions were supportive of the changes, 3 were opposed and 3 commented on improvements which could be considered in the design.



Figure 20 On-site community consultation

7 Monitoring

Given the proposed Macquarie University Gateway Project will involve a narrowing of the University Avenue road carriageway down to two lanes (from the current three), it is proposed to monitor the performance of the road to ensure buses continue to operate satisfactorily through the campus. Conditions C15(2) and B5(1), (2) of the Macquarie University Concept Plan Approval (MP06_0016) noted that provision for adequate setbacks along University Avenue (between Herring Road and Research Park Drive) be made within the Concept Plan.

The key factor dictating the performance of buses through the campus (and therefore the need/trigger to provide bus priority) relates to the volume of traffic using the kerbside traffic lane on University Avenue. This ultimately impacts queue lengths and delays traffic and buses experience at the University Avenue / Herring Road / Waterloo Road intersection.

Traffic modelling undertaken for this study indicates that following the removal of the right turn lane and amendments to the traffic signal phasing arrangements, the kerbside traffic lane on University Avenue has the capacity to accommodate 398 vehicles per hour. Outputs from the traffic modelling indicating this capacity is presented in Appendix A.

Macquarie University will commit to undertake a traffic count, over a minimum four week period, every two years to understand the volume of traffic using the kerbside travel lane on University Avenue. Should the volume of traffic in the kerbside lane, in the busiest hour of the day for greater than 50% of the survey period, exceed 398 vehicles, Macquarie University will commit to initiating discussions with RMS and Transport for NSW to discuss the potential for either:

- Providing a bus priority lane on University Avenue; or
- Reinstating the right turn lane on University Avenue.

8 Summary

Arup has produced this report to summarise the traffic impacts of the network reconfiguration around Macquarie University. The report support the key objectives of the Macquarie University Master Plan including enhancing pedestrian safety, amenity and connectivity of the University to its surroundings.

Traffic and origin-destination surveys were undertaken to measure the current network and situation, and assess the feasibility and the effectiveness of potential opportunities. The data found a large number of vehicles utilising the internal roads ('rat running') through Macquarie University whilst travelling in Macquarie Park.

The two proposed amendments to the road network layout and configuration were modelled. This includes the closure of Research Park Drive near University Avenue and prohibiting the existing right turn ban from University Avenue onto Herring Road. As a result, the Herring Road / Waterloo Road intersection was reconfigured with one ingress lane and two egress lanes from University Avenue.

The traffic modelling undertaken indicates that there is minimal overall change to the overall network. However, there is a significant improvement to Herring Road / Waterloo Road as a result of the removal of the right turn movement, and the re-optimisation of the signals. Delays were shown to reduce for general traffic in both peak hours.

Buses travelling around Macquarie Park are also shown to result in a net negative delay with the two amendments. In both peaks, modelling suggests buses travelling through the Herring Road / Waterloo Road intersection reduces its overall delay by up to 12 seconds.

Appendix A

Traffic Modelling Outputs

MOVEMENT SUMMARY

 Site: 1 [Herring_Talavera_2014_AM]

New Site

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring Road											
1	L2	67	9.9	0.102	24.5	LOS B	1.6	12.0	0.56	0.69	30.6
2	T1	99	5.0	0.268	34.2	LOS C	3.6	26.0	0.84	0.66	33.4
3	R2	282	1.3	0.783	46.5	LOS D	12.4	87.9	0.99	0.89	19.5
Approach		448	3.4	0.783	40.5	LOS C	12.4	87.9	0.89	0.81	24.2
East: Talavera Road (E)											
4	L2	103	1.1	0.103	9.1	LOS A	0.7	5.1	0.30	0.62	41.8
5	T1	259	0.6	0.185	19.3	LOS B	3.2	22.4	0.59	0.48	34.7
6	R2	41	2.8	0.172	51.1	LOS D	0.9	6.4	0.95	0.70	26.4
Approach		403	0.9	0.185	19.9	LOS B	3.2	22.4	0.55	0.54	34.3
North: M2 Ramps											
7	L2	176	2.0	0.357	26.8	LOS B	2.2	15.7	0.95	0.76	35.4
9	R2	88	1.9	0.713	55.0	LOS D	4.2	29.9	1.00	0.84	26.9
Approach		264	2.0	0.713	36.2	LOS C	4.2	29.9	0.97	0.79	31.8
West: Talavera Road (W)											
10	L2	58	1.0	0.815	24.9	LOS B	15.6	111.2	0.92	0.86	40.8
11	T1	991	2.3	0.815	19.5	LOS B	15.7	111.8	0.92	0.86	34.3
12	R2	22	100.0	0.188	48.0	LOS D	0.9	12.3	0.94	0.72	21.6
Approach		1071	4.2	0.815	20.4	LOS B	15.7	111.8	0.92	0.85	34.4
All Vehicles		2186	3.2	0.815	26.3	LOS B	15.7	111.8	0.85	0.78	31.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	33.9	LOS D	0.1	0.1	0.87	0.87	
P2S	East Slip/Bypass Lane Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	20.2	LOS C	0.1	0.1	0.87	0.87	
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		211	33.2	LOS D			0.90	0.90	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Herring_Talavera_2014_PM]**

New Site

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring Road											
1	L2	101	9.9	0.174	28.7	LOS C	2.7	20.8	0.65	0.72	28.4
2	T1	339	5.0	0.930	53.9	LOS D	16.8	120.1	0.99	1.06	26.3
3	R2	238	1.3	0.930	59.7	LOS E	16.8	120.1	1.00	1.07	16.8
Approach		678	4.4	0.930	52.2	LOS D	16.8	120.1	0.94	1.02	23.3
East: Talavera Road (E)											
4	L2	184	1.1	0.174	8.4	LOS A	1.1	7.5	0.26	0.62	42.7
5	T1	501	0.6	0.319	17.0	LOS B	6.0	42.3	0.58	0.49	36.5
6	R2	355	2.8	0.891	57.9	LOS E	8.9	64.0	1.00	0.98	24.6
Approach		1040	1.4	0.891	29.4	LOS C	8.9	64.0	0.67	0.68	30.4
North: M2 Ramps											
7	L2	53	2.0	0.081	23.3	LOS B	0.6	4.1	0.86	0.70	37.2
9	R2	53	1.9	0.429	52.4	LOS D	2.4	17.1	1.00	0.74	27.6
Approach		106	2.0	0.429	37.8	LOS C	2.4	17.1	0.93	0.72	31.5
West: Talavera Road (W)											
10	L2	100	1.0	0.464	19.4	LOS B	5.6	39.9	0.78	0.70	43.4
11	T1	441	2.3	0.464	14.4	LOS A	5.7	40.5	0.77	0.66	38.1
12	R2	24	100.0	0.295	52.6	LOS D	1.1	14.4	0.98	0.72	20.4
Approach		565	6.2	0.464	16.9	LOS B	5.7	40.5	0.78	0.67	38.0
All Vehicles		2389	3.4	0.930	33.3	LOS C	16.8	120.1	0.78	0.78	29.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	30.5	LOS D	0.1	0.1	0.82	0.82	
P2S	East Slip/Bypass Lane Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	19.8	LOS B	0.1	0.1	0.87	0.87	
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		211	32.2	LOS D			0.89	0.89	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Herring_Talavera_2014_AM_Scenario]**

New Site

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring Road											
1	L2	117	9.9	0.183	26.0	LOS B	3.0	22.5	0.61	0.72	29.8
2	T1	99	5.0	0.303	36.3	LOS C	3.7	27.2	0.87	0.69	32.5
3	R2	282	1.3	0.887	54.2	LOS D	13.9	98.4	1.00	0.98	17.6
Approach		498	4.0	0.887	44.0	LOS D	13.9	98.4	0.88	0.86	23.0
East: Talavera Road (E)											
4	L2	103	1.1	0.105	9.4	LOS A	0.8	5.5	0.31	0.63	41.3
5	T1	259	0.6	0.179	18.4	LOS B	3.1	21.7	0.58	0.47	35.4
6	R2	41	2.8	0.172	51.1	LOS D	0.9	6.4	0.95	0.70	26.4
Approach		403	0.9	0.179	19.4	LOS B	3.1	21.7	0.55	0.53	34.6
North: M2 Ramps											
7	L2	176	2.0	0.357	26.6	LOS B	2.2	15.3	0.95	0.76	35.4
9	R2	88	1.9	0.713	55.0	LOS D	4.2	29.9	1.00	0.84	26.9
Approach		264	2.0	0.713	36.1	LOS C	4.2	29.9	0.97	0.79	31.8
West: Talavera Road (W)											
10	L2	58	1.0	0.848	25.9	LOS B	18.0	128.6	0.93	0.90	40.3
11	T1	1097	2.3	0.848	20.4	LOS B	18.0	128.6	0.93	0.89	33.7
12	R2	22	100.0	0.171	46.7	LOS D	0.9	12.1	0.93	0.72	22.0
Approach		1177	4.0	0.848	21.2	LOS B	18.0	128.6	0.93	0.89	33.8
All Vehicles		2342	3.3	0.887	27.4	LOS B	18.0	128.6	0.86	0.81	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	33.0	LOS D	0.1	0.1	0.86	0.86	
P2S	East Slip/Bypass Lane Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	19.2	LOS B	0.1	0.1	0.86	0.86	
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		211	32.7	LOS D			0.90	0.90	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Herring_Talavera_2014_PM_Scenario]**

New Site

Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring Road											
1	L2	131	9.9	0.226	29.1	LOS C	3.7	27.7	0.67	0.73	28.2
2	T1	339	5.0	0.898	48.2	LOS D	16.3	116.1	0.97	0.99	27.9
3	R2	238	1.3	0.898	54.2	LOS D	16.3	116.1	1.00	1.02	18.0
Approach		708	4.7	0.898	46.7	LOS D	16.3	116.1	0.92	0.95	24.8
East: Talavera Road (E)											
4	L2	184	1.1	0.171	8.1	LOS A	1.0	6.8	0.25	0.62	43.0
5	T1	501	0.6	0.319	17.0	LOS B	6.0	42.3	0.58	0.49	36.5
6	R2	355	2.8	0.891	57.9	LOS E	8.9	64.0	1.00	0.98	24.6
Approach		1040	1.4	0.891	29.4	LOS C	8.9	64.0	0.67	0.68	30.4
North: M2 Ramps											
7	L2	53	2.0	0.081	23.3	LOS B	0.6	4.1	0.86	0.70	37.2
9	R2	53	1.9	0.429	52.4	LOS D	2.4	17.1	1.00	0.74	27.6
Approach		106	2.0	0.429	37.8	LOS C	2.4	17.1	0.93	0.72	31.5
West: Talavera Road (W)											
10	L2	100	1.0	0.548	21.0	LOS B	6.9	49.2	0.83	0.73	42.5
11	T1	515	2.3	0.548	15.7	LOS B	6.9	49.4	0.82	0.70	37.0
12	R2	24	100.0	0.344	54.3	LOS D	1.1	14.8	0.99	0.72	20.0
Approach		639	5.8	0.548	18.0	LOS B	6.9	49.4	0.83	0.71	37.0
All Vehicles		2493	3.5	0.898	31.7	LOS C	16.3	116.1	0.79	0.77	29.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	30.5	LOS D	0.1	0.1	0.82	0.82	
P2S	East Slip/Bypass Lane Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	20.2	LOS C	0.1	0.1	0.87	0.87	
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94	
All Pedestrians		211	32.3	LOS D			0.89	0.89	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Khartoum_Talavera_2014_AM]**

New Site

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Talavera Rd (SE)											
21	L2	136	3.0	0.574	42.7	LOS D	14.7	105.2	0.91	0.83	30.3
22	T1	450	3.0	0.574	41.3	LOS C	15.6	111.8	0.91	0.79	29.7
23	R2	44	3.0	0.071	21.3	LOS B	1.0	7.5	0.71	0.68	40.0
Approach		630	3.0	0.574	40.2	LOS C	15.6	111.8	0.89	0.79	30.5
NorthEast: Khartoum (NE)											
24	L2	18	3.0	0.430	59.1	LOS E	5.2	37.0	0.97	0.78	29.2
25	T1	125	3.0	0.592	56.4	LOS D	7.9	56.5	0.98	0.79	28.3
26	R2	76	3.0	0.592	66.2	LOS E	7.9	56.5	1.00	0.80	26.6
Approach		219	3.0	0.592	60.0	LOS E	7.9	56.5	0.99	0.79	27.7
NorthWest: Talavera Rd (NW)											
27	L2	307	3.0	1.182	244.4	LOS F	86.5	621.3	1.00	1.74	10.9
28	T1	681	3.0	1.182	261.9	LOS F	86.5	621.3	1.00	1.83	9.5
29	R2	500	3.0	0.874	37.7	LOS C	22.5	161.7	0.90	0.94	30.5
Approach		1488	3.0	1.182	182.9	LOS F	86.5	621.3	0.97	1.51	12.5
SouthWest: Khartoum (SW)											
30	L2	91	3.0	0.410	27.8	LOS B	3.3	23.8	0.62	0.71	34.7
31	T1	74	3.0	1.039	130.3	LOS F	21.3	152.9	1.00	1.29	16.8
32	R2	144	3.0	1.039	135.9	LOS F	21.3	152.9	1.00	1.29	15.5
Approach		309	3.0	1.039	102.8	LOS F	21.3	152.9	0.89	1.12	18.7
All Vehicles		2646	3.0	1.182	129.4	LOS F	86.5	621.3	0.94	1.24	16.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P5	SouthEast Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P6	NorthEast Full Crossing	53	41.7	LOS E	0.2	0.2	0.80	0.80	
P7	NorthWest Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P8	SouthWest Full Crossing	53	41.7	LOS E	0.2	0.2	0.80	0.80	
All Pedestrians		211	50.5	LOS E			0.88	0.88	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Khartoum_Talavera_2014_PM]**

New Site

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Talavera Rd (SE)											
21	L2	180	3.0	0.820	50.1	LOS D	30.8	220.9	0.98	0.95	28.2
22	T1	809	3.0	0.820	45.1	LOS D	30.8	220.9	0.96	0.92	28.7
23	R2	49	3.0	0.224	33.9	LOS C	2.0	14.1	0.86	0.72	34.9
Approach		1038	3.0	0.820	45.4	LOS D	30.8	220.9	0.96	0.91	28.9
NorthEast: Khartoum (NE)											
24	L2	23	3.0	0.383	60.0	LOS E	4.3	30.6	0.97	0.80	28.9
25	T1	65	3.0	0.528	54.9	LOS D	6.8	49.1	0.97	0.79	28.7
26	R2	105	3.0	0.528	65.7	LOS E	6.8	49.1	0.99	0.79	26.3
Approach		193	3.0	0.528	61.4	LOS E	6.8	49.1	0.98	0.79	27.3
NorthWest: Talavera Rd (NW)											
27	L2	440	3.0	0.507	29.5	LOS C	19.0	136.4	0.74	0.79	36.1
28	T1	288	3.0	0.445	35.8	LOS C	14.1	101.4	0.83	0.71	31.6
29	R2	142	3.0	0.838	48.6	LOS D	6.8	49.0	1.00	0.94	27.2
Approach		870	3.0	0.838	34.7	LOS C	19.0	136.4	0.81	0.79	33.0
SouthWest: Khartoum (SW)											
30	L2	169	3.0	0.242	34.4	LOS C	7.2	51.6	0.72	0.76	32.1
31	T1	203	3.0	0.506	37.9	LOS C	13.3	95.6	0.85	0.74	34.2
32	R2	62	3.0	0.506	43.6	LOS D	13.3	95.6	0.85	0.74	31.1
Approach		434	3.0	0.506	37.4	LOS C	13.3	95.6	0.80	0.75	33.0
All Vehicles		2535	3.0	0.838	41.6	LOS C	30.8	220.9	0.88	0.83	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P6	NorthEast Full Crossing	53	35.5	LOS D	0.1	0.1	0.74	0.74
P7	NorthWest Full Crossing	53	40.1	LOS E	0.2	0.2	0.79	0.79
P8	SouthWest Full Crossing	53	35.5	LOS D	0.1	0.1	0.74	0.74
All Pedestrians		211	42.6	LOS E			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Khartoum_Talavera_2014_AM_Scenario]**

New Site

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Talavera Rd (SE)											
21	L2	136	3.0	0.590	43.6	LOS D	14.8	106.5	0.92	0.84	30.0
22	T1	450	3.0	0.590	42.2	LOS C	15.8	113.2	0.92	0.80	29.5
23	R2	44	3.0	0.069	20.9	LOS B	1.0	7.5	0.70	0.68	40.2
Approach		630	3.0	0.590	41.0	LOS C	15.8	113.2	0.90	0.80	30.2
NorthEast: Khartoum (NE)											
24	L2	18	3.0	0.430	59.1	LOS E	5.2	37.0	0.97	0.78	29.2
25	T1	125	3.0	0.592	56.4	LOS D	7.9	56.5	0.98	0.79	28.3
26	R2	76	3.0	0.592	66.2	LOS E	7.9	56.5	1.00	0.80	26.6
Approach		219	3.0	0.592	60.0	LOS E	7.9	56.5	0.99	0.79	27.7
NorthWest: Talavera Rd (NW)											
27	L2	307	3.0	1.257	309.5	LOS F	101.1	725.6	1.00	1.95	8.9
28	T1	713	3.0	1.257	326.4	LOS F	101.1	725.6	1.00	2.04	7.9
29	R2	574	3.0	0.982	78.5	LOS F	40.2	288.9	0.95	1.12	21.0
Approach		1594	3.0	1.257	233.9	LOS F	101.1	725.6	0.98	1.69	10.3
SouthWest: Khartoum (SW)											
30	L2	91	3.0	0.410	27.2	LOS B	3.3	23.5	0.61	0.70	35.0
31	T1	74	3.0	1.039	130.3	LOS F	21.3	152.9	1.00	1.29	16.8
32	R2	144	3.0	1.039	135.9	LOS F	21.3	152.9	1.00	1.29	15.5
Approach		309	3.0	1.039	102.6	LOS F	21.3	152.9	0.88	1.12	18.8
All Vehicles		2752	3.0	1.257	161.1	LOS F	101.1	725.6	0.95	1.35	13.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P5	SouthEast Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P6	NorthEast Full Crossing	53	42.5	LOS E	0.2	0.2	0.81	0.81	
P7	NorthWest Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P8	SouthWest Full Crossing	53	42.5	LOS E	0.2	0.2	0.81	0.81	
All Pedestrians		211	50.9	LOS E			0.88	0.88	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [Khartoum_Talavera_2014_PM_Scenario]**

New Site

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Talavera Rd (SE)											
21	L2	180	3.0	0.739	41.8	LOS C	27.5	197.2	0.93	0.88	30.7
22	T1	809	3.0	0.739	36.3	LOS C	27.5	197.2	0.90	0.82	31.2
23	R2	49	3.0	0.199	30.3	LOS C	1.8	13.1	0.81	0.71	36.2
Approach		1038	3.0	0.739	37.0	LOS C	27.5	197.2	0.90	0.82	31.4
NorthEast: Khartoum (NE)											
24	L2	23	3.0	0.383	58.5	LOS E	4.3	30.6	0.97	0.79	29.2
25	T1	65	3.0	0.528	53.6	LOS D	6.8	49.1	0.97	0.79	29.1
26	R2	105	3.0	0.528	65.7	LOS E	6.8	49.1	0.99	0.79	26.3
Approach		193	3.0	0.528	60.8	LOS E	6.8	49.1	0.98	0.79	27.5
NorthWest: Talavera Rd (NW)											
27	L2	440	3.0	0.470	25.9	LOS B	17.6	126.1	0.69	0.77	37.6
28	T1	310	3.0	0.430	32.1	LOS C	14.5	103.9	0.79	0.68	32.9
29	R2	194	3.0	1.017	99.1	LOS F	14.1	100.9	1.00	1.19	18.1
Approach		944	3.0	1.017	43.0	LOS D	17.6	126.1	0.79	0.83	30.3
SouthWest: Khartoum (SW)											
30	L2	169	3.0	0.269	38.2	LOS C	7.7	55.0	0.76	0.77	30.7
31	T1	203	3.0	0.592	42.5	LOS D	14.1	101.4	0.89	0.77	32.6
32	R2	62	3.0	0.592	48.1	LOS D	14.1	101.4	0.89	0.77	29.7
Approach		434	3.0	0.592	41.7	LOS C	14.1	101.4	0.84	0.77	31.5
All Vehicles		2609	3.0	1.017	41.7	LOS C	27.5	197.2	0.86	0.81	30.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P6	NorthEast Full Crossing	53	31.9	LOS D	0.1	0.1	0.70	0.70
P7	NorthWest Full Crossing	53	44.1	LOS E	0.2	0.2	0.82	0.82
P8	SouthWest Full Crossing	53	31.9	LOS D	0.1	0.1	0.70	0.70
All Pedestrians		211	41.8	LOS E			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 1 [HerringMidblock_2014_AM]**

New Site

Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring											
2	T1	906	0.0	0.378	7.3	LOS A	7.7	54.2	0.54	0.47	44.1
Approach		906	0.0	0.378	7.3	LOS A	7.7	54.2	0.54	0.47	44.1
North: Herring											
8	T1	248	0.0	0.104	5.9	LOS A	1.7	12.1	0.43	0.35	46.4
Approach		248	0.0	0.104	5.9	LOS A	1.7	12.1	0.43	0.35	46.4
All Vehicles		1154	0.0	0.378	7.0	LOS A	7.7	54.2	0.52	0.45	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
All Pedestrians		53	29.3	LOS C			0.92	0.92	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 **Site: 1 [HerringMidblock_2014_PM]**

New Site

Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring											
2	T1	1148	0.0	0.479	7.9	LOS A	10.7	74.8	0.59	0.52	49.8
Approach		1148	0.0	0.479	7.9	LOS A	10.7	74.8	0.59	0.52	49.8
North: Herring											
8	T1	563	0.0	0.235	6.5	LOS A	4.3	30.1	0.48	0.41	51.4
Approach		563	0.0	0.235	6.5	LOS A	4.3	30.1	0.48	0.41	51.4
All Vehicles		1711	0.0	0.479	7.5	LOS A	10.7	74.8	0.55	0.49	50.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
All Pedestrians		53	29.3	LOS C			0.92	0.92	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 1 [HerringMidblock_2014_AM_Scenario]

New Site

Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring											
2	T1	1106	0.0	0.462	7.8	LOS A	10.1	71.0	0.58	0.51	43.2
Approach		1106	0.0	0.462	7.8	LOS A	10.1	71.0	0.58	0.51	43.2
North: Herring											
8	T1	248	0.0	0.104	5.9	LOS A	1.7	12.1	0.43	0.35	46.4
Approach		248	0.0	0.104	5.9	LOS A	1.7	12.1	0.43	0.35	46.4
All Vehicles		1354	0.0	0.462	7.5	LOS A	10.1	71.0	0.55	0.48	43.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
All Pedestrians		53	29.3	LOS C			0.92	0.92	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: 1 [HerringMidblock_2014_PM_Scenario]

New Site

Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herring											
2	T1	1268	0.0	0.529	8.3	LOS A	12.4	86.5	0.62	0.55	49.4
Approach		1268	0.0	0.529	8.3	LOS A	12.4	86.5	0.62	0.55	49.4
North: Herring											
8	T1	563	0.0	0.235	6.5	LOS A	4.3	30.1	0.48	0.41	51.4
Approach		563	0.0	0.235	6.5	LOS A	4.3	30.1	0.48	0.41	51.4
All Vehicles		1831	0.0	0.529	7.7	LOS A	12.4	86.5	0.57	0.51	50.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
All Pedestrians		53	29.3	LOS C			0.92	0.92	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

 Site: [Waterloo_Herring_2014_AM]

Signals - Fixed Time Coordinated Cycle Time = 133 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Waterloo Road (SE)											
1	L2	123	16.3	0.155	14.6	LOS B	1.7	14.3	0.43	0.67	40.7
2	T1	239	0.8	0.543	53.5	LOS D	13.0	91.9	0.89	0.79	18.4
3	R2	172	45.9	0.451	32.6	LOS C	6.5	68.4	0.76	0.76	22.9
Approach		534	18.9	0.543	37.8	LOS C	13.0	91.9	0.74	0.76	23.0
NorthEast: Herring Road (NE)											
4	L2	169	39.6	0.375	30.9	LOS C	6.0	61.3	0.73	0.76	23.8
5	T1	108	16.7	0.207	54.1	LOS D	3.0	24.6	0.87	0.67	22.6
6	R2	91	36.3	0.402	62.5	LOS E	5.3	52.2	0.91	0.77	15.6
Approach		368	32.1	0.402	45.5	LOS D	6.0	61.3	0.81	0.73	20.6
NorthWest: University Avenue (NW)											
7	L2	119	33.6	0.207	29.3	LOS C	5.0	47.9	0.68	0.66	20.8
8	T1	220	0.9	0.508	48.7	LOS D	12.5	88.4	0.93	0.77	19.0
9	R2	59	5.1	0.125	25.8	LOS B	2.2	16.0	0.75	0.65	28.4
Approach		398	11.3	0.508	39.5	LOS C	12.5	88.4	0.83	0.72	20.8
SouthWest: Herring Road (SW)											
10	L2	238	1.7	0.918	73.6	LOS F	35.4	254.5	1.00	1.04	19.5
11	T1	615	3.7	0.918	68.3	LOS E	35.4	254.5	0.99	1.06	19.1
12	R2	695	3.2	0.896	51.4	LOS D	18.9	137.0	1.00	0.97	24.4
Approach		1548	3.2	0.918	61.5	LOS E	35.4	254.5	1.00	1.01	21.3
All Vehicles		2848	11.0	0.918	51.9	LOS D	35.4	254.5	0.90	0.89	21.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	50	60.8	LOS F	0.2	0.2	0.96	0.96	
P2	NorthEast Full Crossing	50	52.5	LOS E	0.2	0.2	0.89	0.89	
P3	NorthWest Full Crossing	50	43.1	LOS E	0.2	0.2	0.81	0.81	
P4	SouthWest Full Crossing	50	53.3	LOS E	0.2	0.2	0.90	0.90	
All Pedestrians		200	52.4	LOS E			0.89	0.89	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: [Waterloo_Herring_2014_PM]

Signals - Fixed Time Coordinated Cycle Time = 133 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Waterloo Road (SE)											
1	L2	672	3.0	0.843	24.7	LOS B	23.0	165.8	0.88	0.87	34.5
2	T1	244	0.8	0.876	72.9	LOS F	17.0	119.7	1.00	0.95	15.5
3	R2	327	24.2	0.789	44.5	LOS D	16.6	147.9	0.96	0.87	19.2
Approach		1243	8.1	0.876	39.3	LOS C	23.0	165.8	0.93	0.89	24.8
NorthEast: Herring Road (NE)											
4	L2	175	38.3	0.520	23.3	LOS B	4.5	44.7	0.67	0.74	27.7
5	T1	422	4.3	0.791	63.3	LOS E	13.8	101.3	1.00	0.89	20.4
6	R2	123	26.8	0.857	79.2	LOS F	8.7	79.7	1.00	0.91	13.5
Approach		720	16.4	0.857	56.3	LOS D	13.8	101.3	0.92	0.86	19.7
NorthWest: University Avenue (NW)											
7	L2	219	18.3	0.512	47.2	LOS D	12.2	102.9	0.90	0.79	17.1
8	T1	227	0.9	0.828	66.3	LOS E	15.6	109.8	1.00	0.98	16.1
9	R2	194	1.5	0.414	31.8	LOS C	8.3	59.0	0.88	0.76	26.7
Approach		640	7.0	0.828	49.3	LOS D	15.6	109.8	0.93	0.85	19.4
SouthWest: Herring Road (SW)											
10	L2	95	4.2	0.506	41.1	LOS C	17.7	129.0	0.84	0.75	26.4
11	T1	602	3.8	0.506	35.5	LOS C	17.7	129.0	0.84	0.74	28.4
12	R2	207	10.6	0.233	30.3	LOS C	3.8	29.4	0.82	0.75	32.1
Approach		904	5.4	0.506	34.9	LOS C	17.7	129.0	0.83	0.74	29.0
All Vehicles		3507	8.9	0.876	43.5	LOS D	23.0	165.8	0.90	0.84	23.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	SouthEast Full Crossing	50	60.8	LOS F	0.2	0.2	0.96	0.96
P2	NorthEast Full Crossing	50	60.8	LOS F	0.2	0.2	0.96	0.96
P3	NorthWest Full Crossing	50	33.3	LOS D	0.1	0.1	0.71	0.71
P4	SouthWest Full Crossing	50	60.8	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	53.9	LOS E			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: [Waterloo_Herring_2014_AM_Scenario]

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Waterloo Road (SE)											
1	L2	123	16.3	0.102	6.5	LOS A	0.3	2.1	0.05	0.59	48.1
2	T1	139	1.4	0.188	24.7	LOS B	3.7	26.1	0.58	0.66	25.5
3	R2	322	24.5	0.811	38.1	LOS C	13.4	119.7	0.96	0.90	21.2
Approach		584	17.3	0.811	28.2	LOS B	13.4	119.7	0.68	0.77	26.6
NorthEast: Herring Road (NE)											
4	L2	169	39.6	0.382	23.7	LOS B	4.3	43.7	0.73	0.75	27.4
5	T1	108	16.7	0.195	40.1	LOS C	2.2	18.4	0.86	0.65	26.9
6	R2	91	36.3	0.432	50.3	LOS D	4.1	40.6	0.93	0.77	17.5
Approach		368	32.1	0.432	35.1	LOS C	4.3	43.7	0.82	0.73	23.8
NorthWest: University Avenue (NW)											
7	L2	79	50.6	0.198	28.1	LOS B	2.8	30.7	0.75	0.68	21.0
8	T1	138	1.4	0.481	43.2	LOS D	6.4	45.0	0.96	0.77	20.0
Approach		217	19.4	0.481	37.7	LOS C	6.4	45.0	0.89	0.74	20.3
SouthWest: Herring Road (SW)											
10	L2	138	2.9	0.707	39.6	LOS C	17.7	127.9	0.95	0.84	26.7
11	T1	665	3.5	0.707	34.0	LOS C	17.7	127.9	0.95	0.83	29.0
12	R2	695	3.2	0.888	40.5	LOS C	13.9	100.4	1.00	0.98	27.9
Approach		1498	3.3	0.888	37.5	LOS C	17.7	127.9	0.97	0.90	28.2
All Vehicles		2667	11.6	0.888	35.2	LOS C	17.7	127.9	0.88	0.84	26.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94	
P2	NorthEast Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	NorthWest Full Crossing	50	29.7	LOS C	0.1	0.1	0.77	0.77	
P4	SouthWest Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		200	40.6	LOS E			0.90	0.90	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 Site: [Waterloo_Herring_2014_PM_Scenario]

Signals - Fixed Time Coordinated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Waterloo Road (SE)											
1	L2	672	3.0	0.372	9.1	LOS A	7.6	54.6	0.14	0.61	46.1
2	T1	184	1.1	0.372	16.6	LOS B	7.6	54.6	0.45	0.67	28.3
3	R2	417	18.9	0.816	35.5	LOS C	17.0	143.9	0.94	0.90	22.2
Approach		1273	7.9	0.816	18.8	LOS B	17.0	143.9	0.45	0.71	34.3
NorthEast: Herring Road (NE)											
4	L2	175	38.3	0.495	19.0	LOS B	3.8	37.8	0.59	0.72	30.6
5	T1	422	4.3	0.741	48.7	LOS D	10.7	78.7	0.99	0.86	24.1
6	R2	123	26.8	0.902	69.1	LOS E	7.3	66.7	1.00	0.97	14.5
Approach		720	16.4	0.902	45.0	LOS D	10.7	78.7	0.89	0.85	22.5
NorthWest: University Avenue (NW)											
7	L2	154	26.0	0.360	35.3	LOS C	6.4	58.2	0.85	0.75	19.4
8	T1	241	0.8	0.824	52.8	LOS D	13.2	93.4	1.00	1.00	18.2
Approach		395	10.6	0.824	46.0	LOS D	13.2	93.4	0.94	0.90	18.6
SouthWest: Herring Road (SW)											
10	L2	35	11.4	0.656	43.0	LOS D	15.5	113.3	0.95	0.81	26.2
11	T1	632	3.6	0.656	37.2	LOS C	15.5	113.3	0.95	0.81	27.9
12	R2	207	10.6	0.429	32.8	LOS C	3.6	27.7	0.95	0.77	30.9
Approach		874	5.6	0.656	36.4	LOS C	15.5	113.3	0.95	0.80	28.5
All Vehicles		3262	9.5	0.902	32.6	LOS C	17.0	143.9	0.74	0.79	27.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94	
P2	NorthEast Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94	
P3	NorthWest Full Crossing	50	33.7	LOS D	0.1	0.1	0.80	0.80	
P4	SouthWest Full Crossing	50	41.3	LOS E	0.1	0.1	0.89	0.89	
All Pedestrians		200	42.1	LOS E			0.89	0.89	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Balaclava_2014_AM

New Site

Signals - Fixed Time Coordinated Cycle Time = 154 seconds (Minimum Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Balaclava Road S											
10	L2	30	21.7	0.480	44.2	LOS D	19.9	146.0	0.76	0.71	33.5
11	T1	351	4.0	0.480	38.3	LOS C	19.9	146.0	0.76	0.71	26.5
12	R2	643	1.5	0.625	56.9	LOS E	20.9	148.3	0.93	0.84	27.5
Approach		1024	3.0	0.625	50.1	LOS D	20.9	148.3	0.87	0.79	27.4
East: Epping Road E											
1	L2	242	3.2	0.332	16.3	LOS B	5.9	46.2	0.43	0.64	47.8
2	T1	695	7.2	0.565	44.4	LOS D	18.8	134.8	0.80	0.70	38.0
3	R2	208	0.0	0.880	95.7	LOS F	8.7	61.0	1.00	0.93	19.7
Approach		1145	5.0	0.880	47.7	LOS D	18.8	134.8	0.76	0.73	34.4
North: Balaclava Road N											
4	L2	26	27.3	0.076	42.5	LOS C	1.7	15.5	0.74	0.66	31.9
5	T1	52	9.9	0.133	54.6	LOS D	2.9	20.6	0.86	0.66	21.5
6	R2	40	33.3	0.688	93.0	LOS F	3.3	29.5	1.00	0.81	19.9
Approach		118	21.7	0.688	64.8	LOS E	3.3	29.5	0.88	0.71	22.7
West: Epping Road W											
7	L2	270	4.9	0.258	9.6	LOS A	2.5	18.3	0.18	0.61	53.3
8	T1	1626	1.1	0.980	87.1	LOS F	55.1	387.8	0.98	1.12	26.4
9	R2	82	1.4	0.697	87.5	LOS F	6.4	45.5	1.00	0.82	21.2
Approach		1978	1.6	0.980	76.5	LOS F	55.1	387.8	0.88	1.04	27.6
All Vehicles		4265	3.4	0.980	62.1	LOS E	55.1	387.8	0.84	0.89	29.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P4	South Full Crossing	6	43.7	LOS E	0.0	0.0	0.75	0.75
P1	East Full Crossing	191	71.7	LOS F	0.8	0.8	0.97	0.97
P2	North Full Crossing	3	45.2	LOS E	0.0	0.0	0.77	0.77
P3	West Full Crossing	108	71.4	LOS F	0.5	0.5	0.97	0.97
All Pedestrians		308	70.8	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Balaclava_2014_PM

New Site

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Balaclava Road S											
10	L2	107	21.7	0.575	64.1	LOS E	13.8	106.5	0.94	0.91	26.4
11	T1	128	4.0	0.575	58.2	LOS E	13.8	106.5	0.94	0.91	20.1
12	R2	324	1.5	0.409	59.6	LOS E	10.2	72.1	0.91	0.80	26.8
Approach		559	6.0	0.575	60.2	LOS E	13.8	106.5	0.92	0.84	25.3
East: Epping Road E											
1	L2	636	3.2	0.769	34.7	LOS C	29.6	227.1	0.86	0.97	36.2
2	T1	1239	7.2	0.983	92.1	LOS F	57.4	410.8	0.99	1.18	25.7
3	R2	55	0.0	0.174	76.6	LOS F	1.9	13.4	0.96	0.72	22.9
Approach		1930	5.6	0.983	72.6	LOS F	57.4	410.8	0.95	1.10	27.5
North: Balaclava Road N											
4	L2	156	27.3	0.359	25.9	LOS B	7.9	73.0	0.80	0.77	39.6
5	T1	279	9.9	0.608	53.8	LOS D	16.7	116.7	0.94	0.81	22.1
6	R2	226	33.3	0.688	64.7	LOS E	15.4	139.0	0.98	0.84	25.1
Approach		661	22.0	0.688	50.8	LOS D	16.7	139.0	0.92	0.81	26.4
West: Epping Road W											
7	L2	98	4.9	0.085	10.7	LOS A	1.5	11.5	0.33	0.63	52.2
8	T1	880	1.1	0.477	43.4	LOS D	17.0	119.9	0.85	0.73	38.3
9	R2	155	1.4	0.988	118.3	LOS F	14.7	104.3	1.00	1.05	17.2
Approach		1133	1.5	0.988	50.8	LOS D	17.0	119.9	0.83	0.77	34.3
All Vehicles		4283	7.1	0.988	61.9	LOS E	57.4	410.8	0.91	0.93	28.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P4	South Full Crossing	6	41.8	LOS E	0.0	0.0	0.75	0.75	
P1	East Full Crossing	191	65.9	LOS F	0.8	0.8	0.94	0.94	
P2	North Full Crossing	3	43.3	LOS E	0.0	0.0	0.76	0.76	
P3	West Full Crossing	108	69.4	LOS F	0.4	0.4	0.96	0.96	
All Pedestrians		308	66.4	LOS F			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Balaclava_2014_AM_Scenario

New Site

Signals - Fixed Time Coordinated Cycle Time = 154 seconds (Minimum Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Balaclava Road S											
10	L2	30	21.7	0.480	44.4	LOS D	19.9	146.0	0.76	0.71	33.4
11	T1	351	4.0	0.480	38.5	LOS C	19.9	146.0	0.76	0.71	26.4
12	R2	643	1.5	0.625	56.9	LOS E	20.9	148.3	0.93	0.84	27.5
Approach		1024	3.0	0.625	50.2	LOS D	20.9	148.3	0.87	0.79	27.4
East: Epping Road E											
1	L2	242	3.2	0.331	16.1	LOS B	5.7	45.0	0.43	0.63	47.9
2	T1	695	7.2	0.565	44.4	LOS D	18.8	134.8	0.80	0.70	38.0
3	R2	208	0.0	0.880	95.7	LOS F	8.7	61.0	1.00	0.93	19.7
Approach		1145	5.0	0.880	47.6	LOS D	18.8	134.8	0.76	0.73	34.4
North: Balaclava Road N											
4	L2	46	27.3	0.116	42.2	LOS C	2.8	25.3	0.74	0.69	31.8
5	T1	57	9.9	0.146	54.7	LOS D	3.2	22.6	0.86	0.67	21.5
6	R2	45	33.3	0.774	94.9	LOS F	3.7	33.7	1.00	0.85	19.6
Approach		148	22.4	0.774	62.9	LOS E	3.7	33.7	0.87	0.73	23.4
West: Epping Road W											
7	L2	270	4.9	0.258	9.6	LOS A	2.5	18.3	0.18	0.61	53.3
8	T1	1652	1.1	0.994	94.8	LOS F	58.4	411.0	0.99	1.16	25.0
9	R2	82	1.4	0.697	87.5	LOS F	6.4	45.5	1.00	0.82	21.2
Approach		2004	1.6	0.994	83.0	LOS F	58.4	411.0	0.88	1.07	26.2
All Vehicles		4321	3.5	0.994	65.2	LOS E	58.4	411.0	0.84	0.90	28.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P4	South Full Crossing	6	43.7	LOS E	0.0	0.0	0.75	0.75
P1	East Full Crossing	191	71.7	LOS F	0.8	0.8	0.97	0.97
P2	North Full Crossing	3	45.2	LOS E	0.0	0.0	0.77	0.77
P3	West Full Crossing	108	71.4	LOS F	0.5	0.5	0.97	0.97
All Pedestrians		308	70.8	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Balaclava_2014_PM_Scenario

New Site

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Balaclava Road S											
10	L2	107	21.7	0.575	64.9	LOS E	13.8	106.5	0.94	0.91	26.2
11	T1	128	4.0	0.575	59.0	LOS E	13.8	106.5	0.94	0.91	19.9
12	R2	324	1.5	0.409	59.6	LOS E	10.2	72.1	0.91	0.80	26.8
Approach		559	6.0	0.575	60.5	LOS E	13.8	106.5	0.92	0.85	25.2
East: Epping Road E											
1	L2	636	3.2	0.772	35.2	LOS C	30.0	230.3	0.86	0.97	36.0
2	T1	1239	7.2	0.983	92.1	LOS F	57.4	410.8	0.99	1.18	25.7
3	R2	55	0.0	0.174	76.6	LOS F	1.9	13.4	0.96	0.72	22.9
Approach		1930	5.6	0.983	72.7	LOS F	57.4	410.8	0.95	1.10	27.5
North: Balaclava Road N											
4	L2	196	27.3	0.429	29.7	LOS C	9.8	90.1	0.81	0.82	37.4
5	T1	304	9.9	0.851	62.9	LOS E	20.3	141.9	0.96	0.93	20.0
6	R2	251	33.3	0.764	68.4	LOS E	18.0	162.4	1.00	0.88	24.3
Approach		751	22.2	0.851	55.9	LOS D	20.3	162.4	0.93	0.89	25.0
West: Epping Road W											
7	L2	98	4.9	0.086	10.9	LOS A	1.6	12.0	0.34	0.63	52.0
8	T1	922	1.1	0.499	43.8	LOS D	18.0	126.7	0.86	0.74	38.1
9	R2	155	1.4	0.988	118.3	LOS F	14.7	104.3	1.00	1.05	17.2
Approach		1175	1.4	0.988	50.9	LOS D	18.0	126.7	0.84	0.77	34.3
All Vehicles		4415	7.4	0.988	62.6	LOS E	57.4	410.8	0.91	0.95	28.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P4	South Full Crossing	6	41.8	LOS E	0.0	0.0	0.75	0.75	
P1	East Full Crossing	191	65.9	LOS F	0.8	0.8	0.94	0.94	
P2	North Full Crossing	3	43.3	LOS E	0.0	0.0	0.76	0.76	
P3	West Full Crossing	108	69.4	LOS F	0.4	0.4	0.96	0.96	
All Pedestrians		308	66.4	LOS F			0.94	0.94	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Herring_2014_AM

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Epping Road (SE)											
1	L2	119	2.7	0.621	43.9	LOS D	19.7	143.5	0.91	0.81	33.1
2	T1	931	4.6	0.621	45.5	LOS D	21.5	157.6	0.92	0.80	37.4
3	R2	663	2.3	0.958	104.6	LOS F	30.6	218.9	1.00	1.05	17.9
Approach		1713	3.6	0.958	68.2	LOS E	30.6	218.9	0.95	0.90	27.7
NorthEast: Herring Road (NE)											
4	L2	263	3.8	0.390	29.2	LOS C	11.6	84.5	0.69	0.77	36.9
5	T1	155	8.1	0.481	70.1	LOS E	7.0	53.5	0.98	0.78	16.6
6	R2	132	14.4	0.481	74.7	LOS F	6.8	52.7	0.98	0.78	22.5
Approach		550	7.6	0.481	51.6	LOS D	11.6	84.5	0.85	0.78	25.9
NorthWest: Epping Road (NW)											
7	L2	602	5.0	0.459	13.3	LOS A	15.7	117.6	0.39	0.69	49.9
8	T1	1695	1.6	0.997	105.6	LOS F	69.2	488.6	0.99	1.26	23.4
9	R2	19	0.0	0.068	64.9	LOS E	1.2	8.3	0.89	0.70	25.2
Approach		2316	2.5	0.997	81.3	LOS F	69.2	488.6	0.83	1.11	26.1
SouthWest: Herring Road (SW)											
10	L2	18	15.0	0.581	66.0	LOS E	18.9	133.9	0.92	0.83	25.6
11	T1	504	0.4	0.581	55.5	LOS D	18.9	133.9	0.90	0.79	19.7
12	R2	363	0.5	0.867	67.2	LOS E	26.6	186.7	0.95	0.94	24.3
Approach		885	0.7	0.867	60.5	LOS E	26.6	186.7	0.92	0.85	22.1
All Vehicles		5464	3.1	0.997	70.8	LOS F	69.2	488.6	0.88	0.97	26.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96	
P2	NorthEast Full Crossing	50	49.7	LOS E	0.2	0.2	0.82	0.82	
P3	NorthWest Full Crossing	50	52.2	LOS E	0.2	0.2	0.84	0.84	
P4	SouthWest Full Crossing	50	45.7	LOS E	0.2	0.2	0.78	0.78	
All Pedestrians		200	54.2	LOS E			0.85	0.85	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Herring_2014_PM

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Epping Road (SE)											
1	L2	280	2.7	0.837	42.2	LOS C	38.5	279.3	0.91	0.92	34.2
2	T1	1670	4.6	0.837	38.3	LOS C	39.7	290.5	0.90	0.86	40.3
3	R2	307	2.3	0.884	91.2	LOS F	12.6	89.9	1.00	0.95	19.7
Approach		2257	4.1	0.884	45.9	LOS D	39.7	290.5	0.92	0.88	35.8
NorthEast: Herring Road (NE)											
4	L2	265	3.8	0.266	6.0	LOS A	0.5	3.3	0.03	0.56	55.3
5	T1	536	8.1	0.850	65.4	LOS E	27.2	207.5	1.00	0.94	17.3
6	R2	533	14.4	0.850	70.4	LOS E	26.0	204.1	1.00	0.92	23.3
Approach		1334	9.8	0.850	55.6	LOS D	27.2	207.5	0.81	0.86	24.0
NorthWest: Epping Road (NW)											
7	L2	323	5.0	0.235	10.3	LOS A	5.5	41.1	0.25	0.64	53.0
8	T1	924	1.6	0.456	34.2	LOS C	15.2	107.6	0.68	0.59	42.5
9	R2	89	0.0	0.811	88.7	LOS F	7.0	48.7	1.00	0.85	20.7
Approach		1336	2.3	0.811	32.0	LOS C	15.2	107.6	0.60	0.62	41.6
SouthWest: Herring Road (SW)											
10	L2	35	15.0	0.680	80.0	LOS F	11.7	84.8	1.00	0.96	22.5
11	T1	284	0.4	0.680	72.0	LOS F	11.7	84.8	1.00	0.89	16.5
12	R2	102	0.5	0.442	71.0	LOS F	7.0	49.5	0.97	0.78	23.6
Approach		421	1.6	0.680	72.4	LOS F	11.7	84.8	0.99	0.87	18.9
All Vehicles		5348	4.9	0.884	47.0	LOS D	39.7	290.5	0.81	0.81	32.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	53	54.7	LOS E	0.2	0.2	0.86	0.86	
P2	NorthEast Full Crossing	53	41.2	LOS E	0.2	0.2	0.74	0.74	
P3	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P4	SouthWest Full Crossing	53	33.4	LOS D	0.1	0.1	0.67	0.67	
All Pedestrians		211	49.6	LOS E			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: Epping_Herring_2014_AM_Scenario**

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Epping Road (SE)											
1	L2	119	2.7	0.608	43.1	LOS D	19.5	141.6	0.90	0.81	33.4
2	T1	931	4.6	0.608	44.6	LOS D	21.3	156.0	0.91	0.79	37.7
3	R2	663	2.3	0.958	104.6	LOS F	30.6	218.9	1.00	1.05	17.9
Approach		1713	3.6	0.958	67.7	LOS E	30.6	218.9	0.94	0.89	27.9
NorthEast: Herring Road (NE)											
4	L2	218	3.8	0.201	11.7	LOS A	4.6	33.8	0.37	0.66	49.2
5	T1	140	8.1	0.457	69.8	LOS E	6.7	50.7	0.98	0.78	16.6
6	R2	132	14.4	0.457	74.4	LOS F	6.4	49.8	0.98	0.78	22.5
Approach		490	7.9	0.457	45.2	LOS D	6.7	50.7	0.71	0.73	27.9
NorthWest: Epping Road (NW)											
7	L2	602	5.0	0.457	13.0	LOS A	15.3	114.7	0.38	0.69	50.3
8	T1	1713	1.6	1.001	110.1	LOS F	72.3	510.5	0.99	1.27	22.8
9	R2	47	0.0	0.168	66.2	LOS E	3.0	21.0	0.91	0.74	25.0
Approach		2362	2.5	1.001	84.5	LOS F	72.3	510.5	0.83	1.11	25.4
SouthWest: Herring Road (SW)											
10	L2	18	15.0	0.600	67.0	LOS E	19.3	136.7	0.93	0.84	25.3
11	T1	504	0.4	0.600	56.5	LOS E	19.3	136.7	0.90	0.79	19.5
12	R2	363	0.5	0.891	72.5	LOS F	27.8	195.7	0.96	0.97	23.3
Approach		885	0.7	0.891	63.3	LOS E	27.8	195.7	0.93	0.87	21.5
All Vehicles		5450	3.0	1.001	72.2	LOS F	72.3	510.5	0.87	0.97	25.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96	
P2	NorthEast Full Crossing	50	48.9	LOS E	0.2	0.2	0.81	0.81	
P3	NorthWest Full Crossing	50	53.0	LOS E	0.2	0.2	0.84	0.84	
P4	SouthWest Full Crossing	50	44.9	LOS E	0.2	0.2	0.77	0.77	
All Pedestrians		200	54.0	LOS E			0.85	0.85	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Epping_Herring_2014_PM_Scenario

Signals - Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Epping Road (SE)											
1	L2	280	2.7	0.879	50.7	LOS D	43.5	315.3	0.96	0.99	31.0
2	T1	1670	4.6	0.879	46.1	LOS D	44.1	322.6	0.95	0.94	37.1
3	R2	307	2.3	0.884	91.2	LOS F	12.6	89.9	1.00	0.95	19.7
Approach		2257	4.1	0.884	52.8	LOS D	44.1	322.6	0.96	0.94	33.4
NorthEast: Herring Road (NE)											
4	L2	100	3.8	0.103	6.0	LOS A	0.1	1.0	0.02	0.55	55.4
5	T1	501	8.1	0.872	69.2	LOS E	27.3	207.8	1.00	0.96	16.7
6	R2	533	14.4	0.872	74.2	LOS F	25.9	204.1	1.00	0.94	22.5
Approach		1134	10.7	0.872	65.9	LOS E	27.3	207.8	0.91	0.92	21.3
NorthWest: Epping Road (NW)											
7	L2	323	5.0	0.234	10.0	LOS A	5.3	39.7	0.24	0.63	53.3
8	T1	950	1.6	0.456	32.4	LOS C	15.4	108.5	0.66	0.58	43.4
9	R2	145	0.0	0.850	86.2	LOS F	11.3	79.0	1.00	0.89	21.1
Approach		1418	2.2	0.850	32.8	LOS C	15.4	108.5	0.60	0.62	41.1
SouthWest: Herring Road (SW)											
10	L2	35	15.0	0.680	80.0	LOS F	11.7	84.8	1.00	0.96	22.5
11	T1	284	0.4	0.680	72.0	LOS F	11.7	84.8	1.00	0.89	16.5
12	R2	102	0.5	0.442	71.0	LOS F	7.0	49.5	0.97	0.78	23.6
Approach		421	1.6	0.680	72.4	LOS F	11.7	84.8	0.99	0.87	18.9
All Vehicles		5230	4.8	0.884	51.8	LOS D	44.1	322.6	0.86	0.84	31.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	SouthEast Full Crossing	53	56.5	LOS E	0.2	0.2	0.87	0.87	
P2	NorthEast Full Crossing	53	39.7	LOS D	0.2	0.2	0.73	0.73	
P3	NorthWest Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P4	SouthWest Full Crossing	53	35.4	LOS D	0.2	0.2	0.69	0.69	
All Pedestrians		211	50.2	LOS E			0.81	0.81	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY



Site: Waterloo_Herring_2014_PM_Scenario_Optimised

Signals - Fixed Time Coordinated Cycle Time = 115 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance													
	Demand Flows			Deg.	Lane	Average	Level of	95% Back of	Queue	Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
SouthEast: Waterloo Road (SE)													
Lane 1	494	3.0	1383	0.358	100	6.0	LOS A	0.8	6.0	Short	150	0.0	NA
Lane 2	362	2.0	1011	0.358	100	16.3	LOS B	7.6	54.0	Full	200	0.0	0.0
Lane 3	417	18.9	527	0.792	100	30.8	LOS C	15.9	134.8	Full	200	0.0	0.0
Approach	1273	7.9		0.792		17.1	LOS B	15.9	134.8				
NorthEast: Herring Road (NE)													
Lane 1	175	38.3	316	0.553	68 ⁵	22.8	LOS B	4.7	46.8	Short	55	0.0	NA
Lane 2	211	4.3	260	0.812	100	56.7	LOS E	12.3	89.9	Full	140	0.0	0.0
Lane 3	211	4.3	260	0.812	100	56.7	LOS E	12.3	89.9	Full	140	0.0	0.0
Lane 4	123	26.8	152	0.808	100	67.3	LOS E	7.4	67.7	Short	65	0.0	NA
Approach	720	16.4		0.812		50.3	LOS D	12.3	89.9				
NorthWest: University Avenue (NW)													
Lane 1	154	26.0	398 ¹	0.391	45 ⁵	32.9	LOS C	6.4	58.3	Short	27	0.0	NA
Lane 2	241	0.8	275 ¹	0.878	100	58.3	LOS E	14.6	103.0	Full	300	0.0	0.0
Approach	395	10.6		0.878		48.4	LOS D	14.6	103.0				
SouthWest: Herring Road (SW)													
Lane 1	337	4.4	469	0.719	100	44.6	LOS D	17.7	129.4	Full	380	0.0	0.0
Lane 2	330	3.6	459	0.719	100	44.1	LOS D	17.4	126.2	Full	380	0.0	0.0
Lane 3	104	10.6	250	0.414	100	35.8	LOS C	4.0	30.9	Short	95	0.0	NA
Lane 4	104	10.6	250	0.414	100	35.8	LOS C	4.0	30.9	Short	90	0.0	NA
Approach	874	5.6		0.719		42.3	LOS C	17.7	129.4				
Intersection	3262	9.5		0.878		35.0	LOS C	17.7	134.8				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.

⁵ Lane under-utilisation found by the program

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LANE SUMMARY



Site: Waterloo_Herring_2014_AM_Scenario_Optimised

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Flows			Deg.	Lane	Average	Level of	95% Back of	Queue	Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
SouthEast: Waterloo Road (SE)													
Lane 1	123	16.3	1204	0.102	54 ⁵	6.5	LOS A	0.3	2.1	Short	150	0.0	NA
Lane 2	139	1.4	738	0.188	100	24.7	LOS B	3.7	26.1	Full	200	0.0	0.0
Lane 3	322	24.5	397	0.811	100	38.1	LOS C	13.4	119.7	Full	200	0.0	0.0
Approach	584	17.3		0.811		28.2	LOS B	13.4	119.7				
NorthEast: Herring Road (NE)													
Lane 1	169	39.6	456	0.371	100	22.9	LOS B	4.2	42.3	Short	55	0.0	NA
Lane 2	54	16.7	277	0.195	53 ⁵	40.1	LOS C	2.2	18.4	Full	140	0.0	0.0
Lane 3	54	16.7	277	0.195	53 ⁵	40.1	LOS C	2.2	18.4	Full	140	0.0	0.0
Lane 4	91	36.3	211	0.432	100	50.3	LOS D	4.1	40.6	Short	65	0.0	NA
Approach	368	32.1		0.432		34.7	LOS C	4.2	42.3				
NorthWest: University Avenue (NW)													
Lane 1	79	50.6	398	0.198	41 ⁵	28.1	LOS B	2.8	30.7	Short	27	0.0	NA
Lane 2	138	1.4	287	0.481	100	43.2	LOS D	6.4	45.0	Full	300	0.0	0.0
Approach	217	19.4		0.481		37.7	LOS C	6.4	45.0				
SouthWest: Herring Road (SW)													
Lane 1	399	3.3	559	0.714	100	36.9	LOS C	17.8	128.3	Full	380	0.0	0.0
Lane 2	404	3.5	566	0.714	100	34.3	LOS C	17.9	129.6	Full	380	0.0	0.0
Lane 3	347	3.2	391	0.888	100	40.5	LOS C	13.9	100.4	Short	95	0.0	NA ⁸
Lane 4	348	3.2	391	0.888	100	40.5	LOS C	13.9	100.4	Short	90	0.0	NA
Approach	1498	3.3		0.888		37.8	LOS C	17.9	129.6				
Intersection	2667	11.6		0.888		35.3	LOS C	17.9	129.6				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁵ Lane under-utilisation found by the program

⁸ Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.

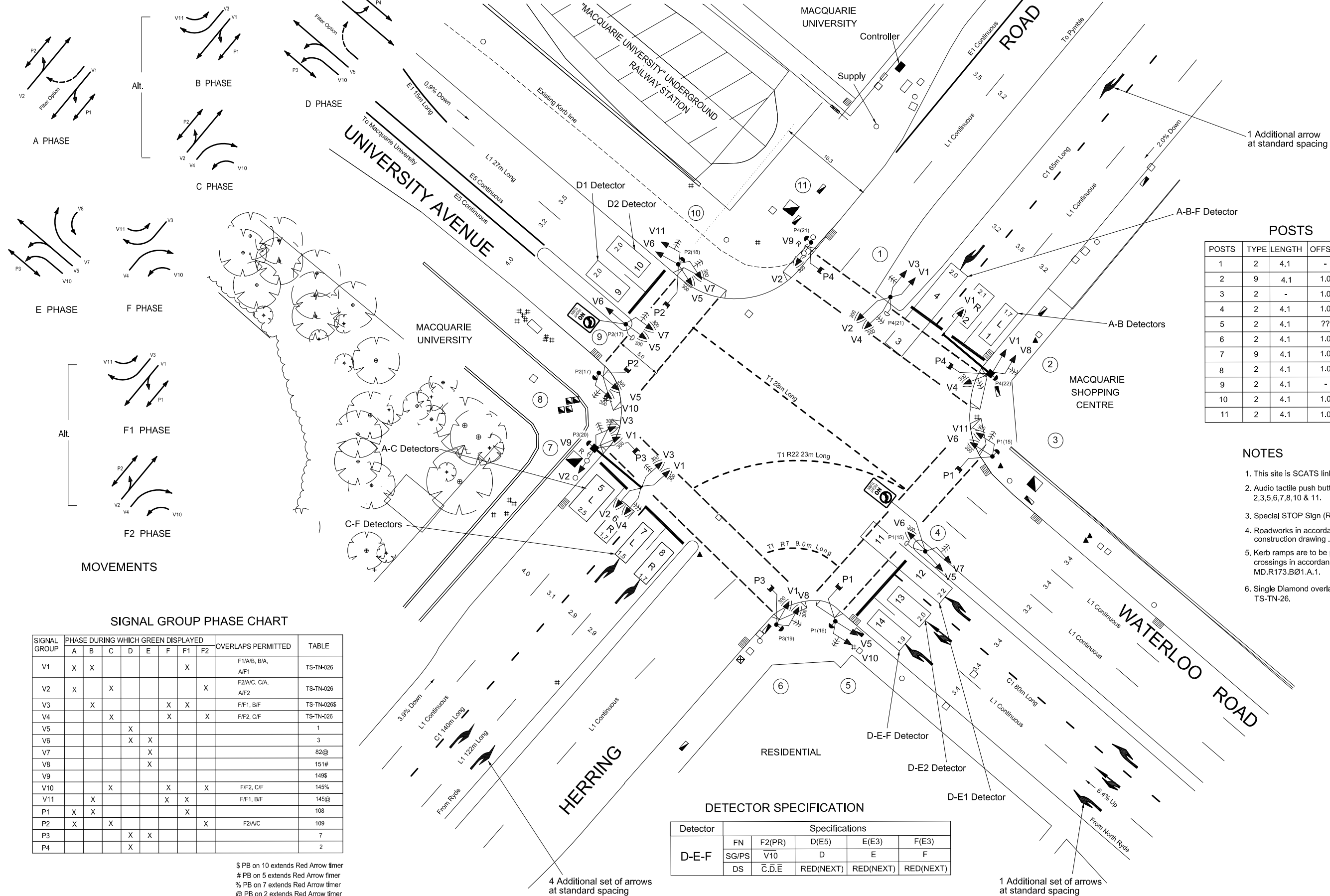
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Appendix B

Revised Traffic Signal Plan
(TCS 1798)

DRAWN BY CADD
DO NOT AMEND MANUALLYDATE IN SERVICE : 05/08/81
RECONSTRUCTION : 00/00/00

POSTS

POSTS	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	-	New
2	9	4.1	1.0	Existing - 6.5m Outreach
3	2	-	1.0	Existing
4	2	4.1	1.0	Existing
5	2	4.1	??	Existing
6	2	4.1	1.0	Existing
7	9	4.1	1.0	Existing - 6.5m Outreach
8	2	4.1	1.0	Existing
9	2	4.1	-	New
10	2	4.1	1.0	New
11	2	4.1	1.0	Existing

NOTES

- This site is SCATS linked.
- Audio tactile push buttons are provided on posts 2,3,5,6,7,8,10 & 11.
- Special STOP Sign (R1-4) is placed on posts 5 & 9.
- Roadworks in accordance with Taylor Thompson Whitting construction drawing
- Kerb ramps are to be provided at all pedestrian crossings in accordance with Model Drawing MD.R173.B01.A.1.
- Single Diamond overlap phasing in accordance with TS-TN-26.

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED								OVERLAPS PERMITTED	TABLE
	A	B	C	D	E	F	F1	F2		
V1	X	X						X	F1/A/B, B/A, A/F1	TS-TN-026
V2		X	X					X	F2/A/C, C/A, A/F2	TS-TN-026
V3			X			X	X		F/F1, B/F	TS-TN-026S
V4				X		X		X	F/F2, C/F	TS-TN-026
V5					X					1
V6				X	X					3
V7					X					82@
V8					X					151#
V9										149S
V10			X			X		X	F/F2, C/F	145%
V11		X				X	X		F/F1, B/F	145@
P1	X	X					X			108
P2	X		X					X	F2/A/C	109
P3				X	X					7
P4				X						2

\$ PB on 10 extends Red Arrow timer
PB on 5 extends Red Arrow timer
% PB on 7 extends Red Arrow timer
@ PB on 2 extends Red Arrow timer

DETECTOR SPECIFICATION

Detector	Specifications				
	FN	F2(PR)	D(E5)	E(E3)	F(E3)
D-E-F	SG/PS	V10	D	E	F
	DS	C.D.E	RED(NEXT)	RED(NEXT)	RED(NEXT)

A ORIGINAL ISSUE

SDATES STIMES \$FILES\$

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	▲	STD POSIT	VD001-5
GAS VALVE	■	PRES. DETECT	VC005-17
SEWER MANHOLE	⊗	VEH. GROUP OP	TS-TN-019
TELECOM PIT	⊠	DET. LOGIC OP	TS-TN-020
ELECT LIGHT POLE	○	PED. MOVEMENT OP	TS-TN-021
POWER POLE	○		
STAY POLE	○		
TELEPHONE BOX	□	SURVEYOR: N/A	
TELECOM PILLAR	●	DATE: N/A	

U.B.D. Ref. Map 193, Q2	I.S.G. E: 310 040
CO-ORDS N: 1 261 045	
DESIGNED CT	
CHECKED JS	
CT	
SITE CHECKED	
BL	
RECOMMENDED	

DESIGN APPROVAL	RMS ACCEPTANCE
APPROVED	RECOMMENDED
POSITION DATE	POSITION DATE
DESIGN PREPARED BY TRANSPORT AND TRAFFIC PLANNING ASSOCIATES	ACCEPTED
POSITION DATE	POSITION DATE

ROADS AND MARITIME SERVICES	
RYDE COUNCIL AREA	
TRAFFIC SIGNALS AT THE INTERSECTION OF HERRING ROAD, WATERLOO ROAD AND UNIVERSITY AVENUE	
DESIGN LAYOUT	TCS No 1798

EXISTING	PROPOSED
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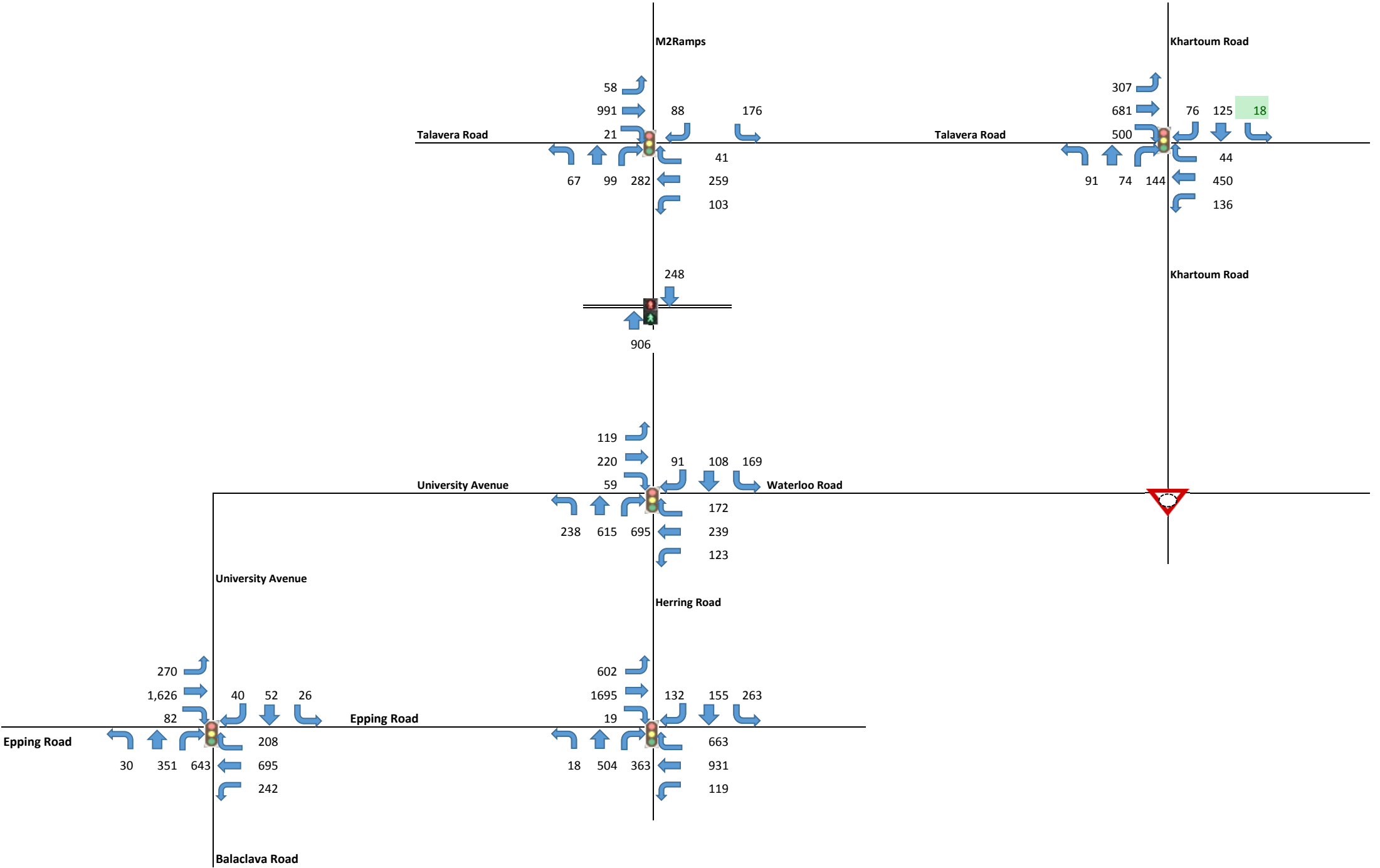
Revision 1 - August 2014

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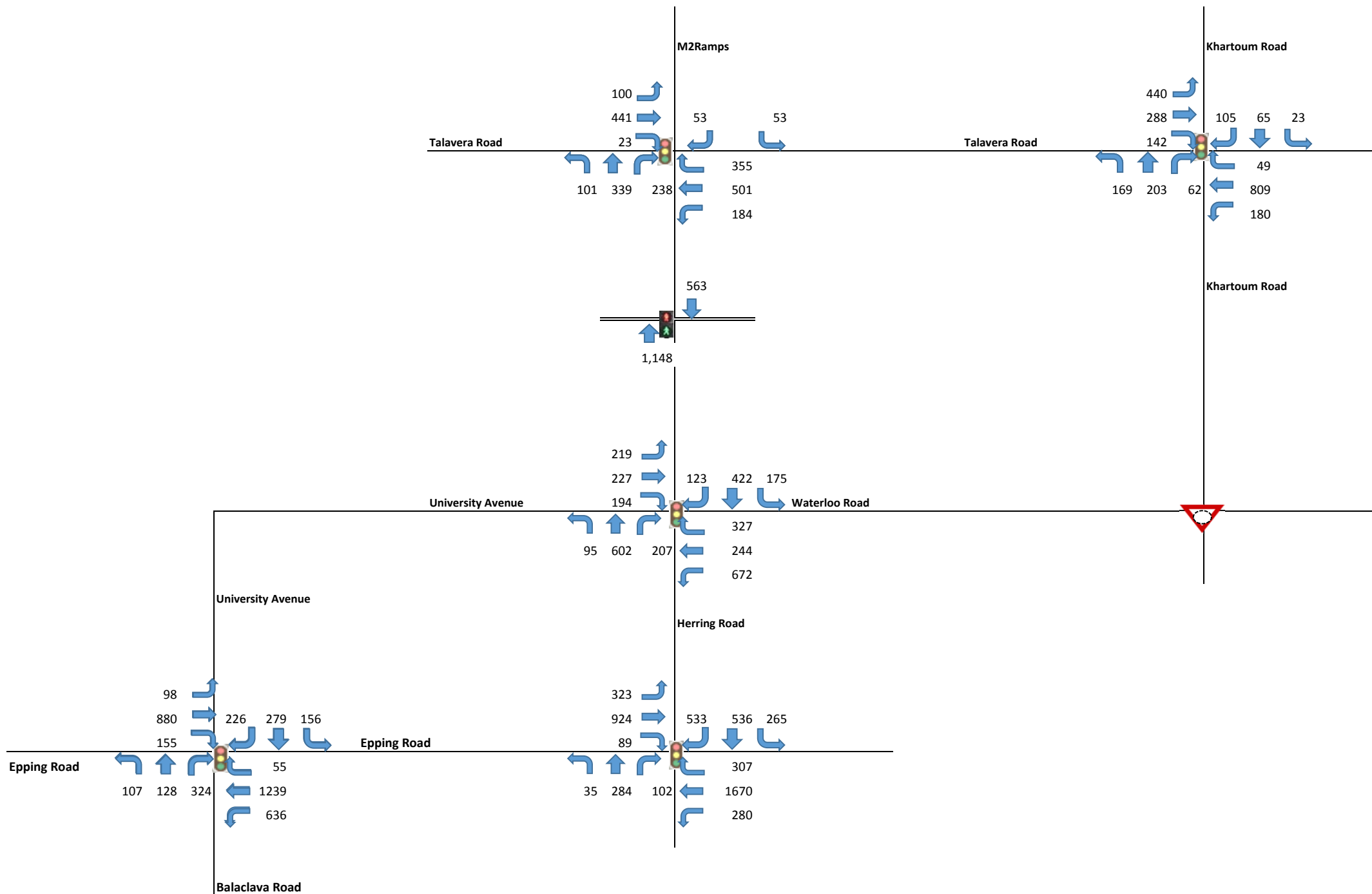
Appendix C

Traffic Volume Diagrams

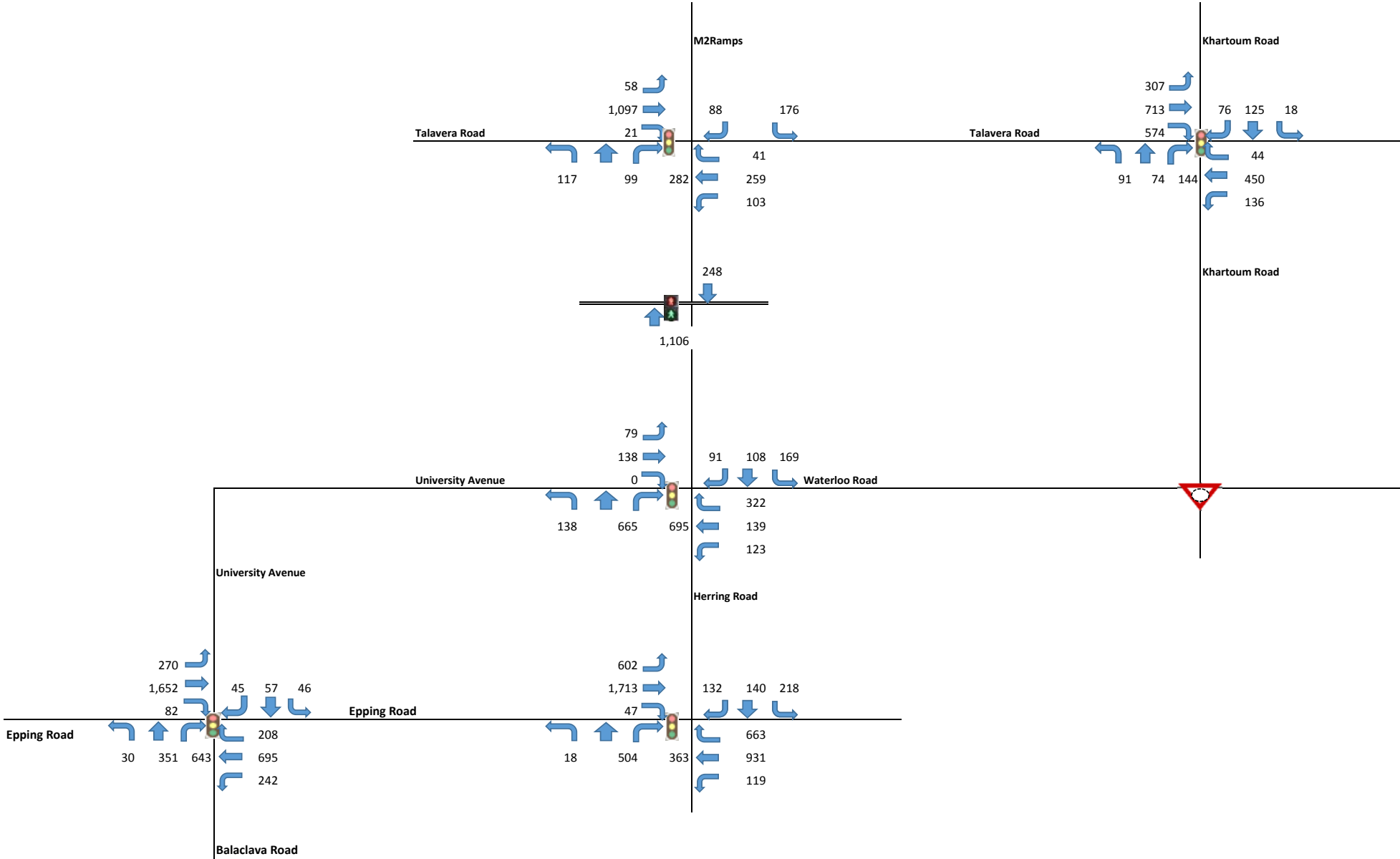
Existing Traffic Volumes - AM Peak Hour



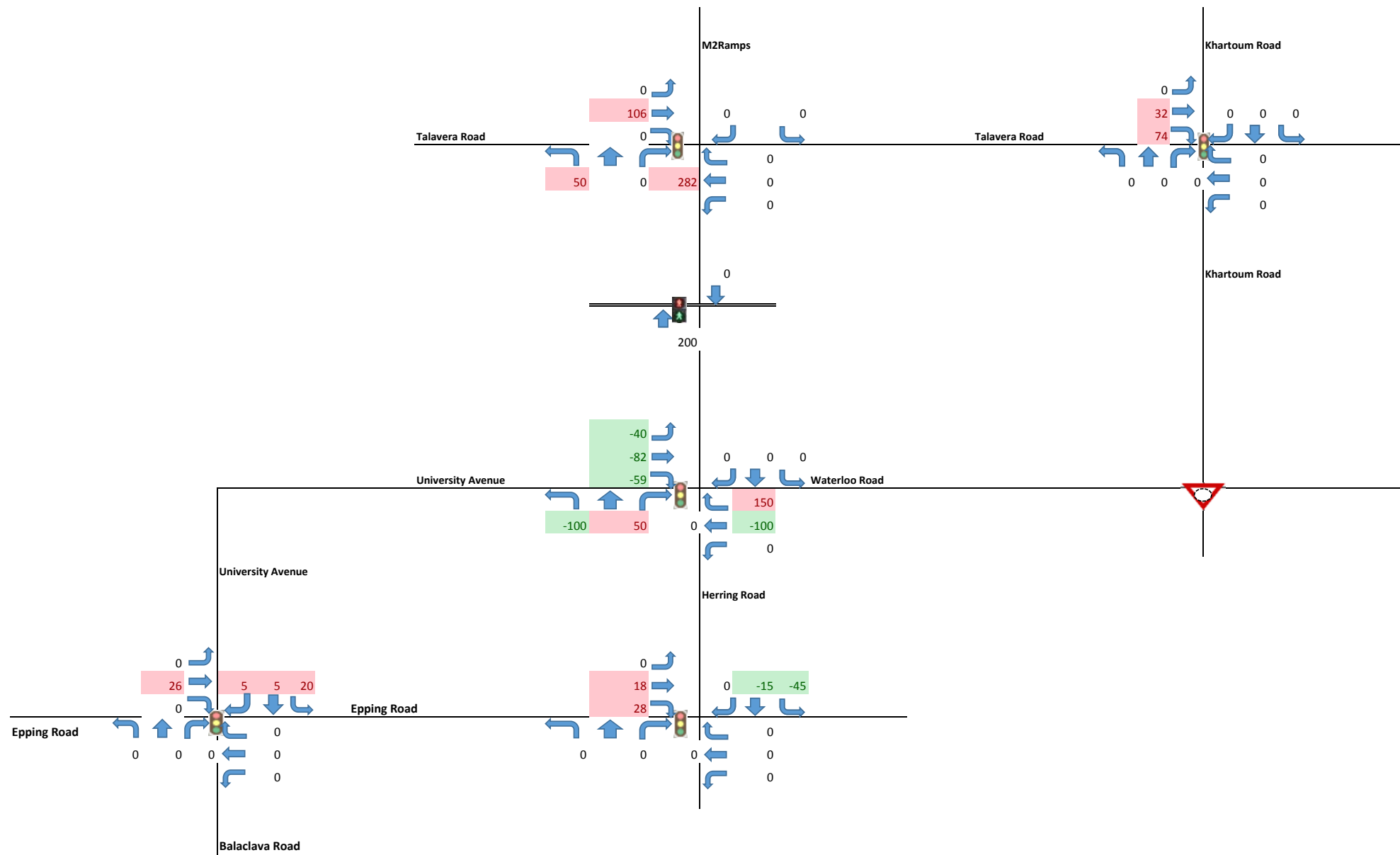
Existing Traffic Volumes - PM Peak Hour



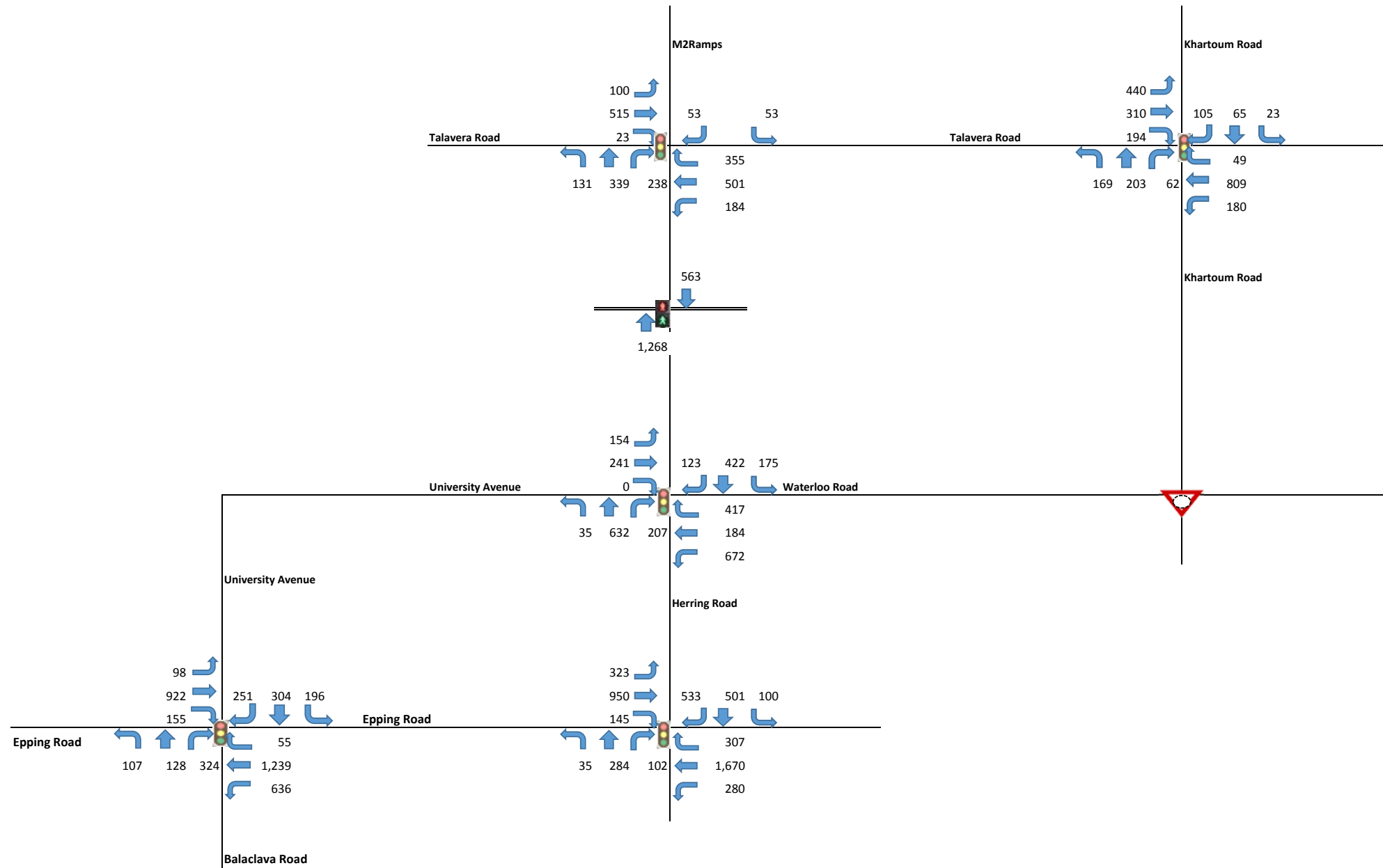
AM Peak Hour Reconfigured Traffic Volumes



AM Peak Hour - Change in traffic flows



PM Peak Hour Reconfigured Traffic Volumes



PM Peak Hour - Change in traffic flows

